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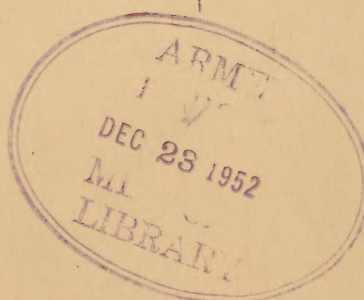
FOR THE CHIEF SURGEON

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MILITARY MEDICAL PROBLEMS IN WESTERN EUROPE

Prepared by

INTELLIGENCE SECTION
OFFICE OF THE CHIEF SURGEON
EUROPEAN THEATER OF OPERATIONS
9 February 1944

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Military Medical Problems in Western Europe

Summary

Coincident with the economic, social and political changes in Europe resulting from the war, there has occurred a similar striking deterioration in the health of the people of the continent. This has been brought about by the partial failure of existing public health practices, the widespread effects of malnutrition and deficiency diseases, and the opportunities for the development and spread of communicable diseases in overcrowded areas. Despite the gradual dissolution of normal public health standards, the German Reich has made many attempts to control the spread of contagious diseases throughout the neighboring countries. Health authorities in occupied areas have been willing to cooperate in these programs for the benefits to be derived for their own countrymen.

The deterioration of public health standards and medical care has been greater in Germany proper than in the occupied countries. Shortages of all essential medical supplies and foodstuffs and German management of distribution and rationing of available foods have been important factors in undermining health in the conquered territories. Hospital facilities are inadequate for the needs of the civilians, and equipment is scarce. The "scorched earth" policy of the Germans lessens the chances of usable hospitals being left for the invading armies.

Water is plentiful, but treatment facilities are inadequate. All water is considered unsafe for human consumption unless tested or treated before use. The Germans have deliberately fouled or contaminated water supplies in areas which they were evacuating, usually by the introduction of foreign matter or detritus, thus changing the odor and/or taste of the water. Sewage systems are inadequate for present needs and seldom is any form of sewage treatment employed. Such facilities are not available in many of the cities and towns. Army units must provide for unit disposal of waste products until the capacity and usability of local facilities can be determined.

The diseases of greatest importance to military forces operating in Europe will be the intestinal diseases (typhoid fever, paratyphoid fever, bacillary dysentery, the common diarrheas, and gastro-enteritis), epidemic louse-borne typhus fever, infectious hepatitis, venereal diseases (gonorrhea, syphilis, chancroid, and lymphogranuloma), the respiratory diseases including influenza and pneumonia, skin diseases, trench fever, and malaria. The skin diseases will include parasitic infestations such as scabies, as well as many types of pustular dermatitis. Diseases of potential military importance include tuberculosis, the contagious diseases (principally scarlet fever, diphtheria, meningitis, and poliomyelitis), relapsing fever, Weil's disease, and dengue. Plague, cholera, and yellow fever are absent, and while their respective vectors are indigenous, these diseases are not likely to be introduced under natural circumstances. The diseases of greatest importance to the civilian population are malnutrition, tuberculosis, epidemic louse-borne typhus fever, intestinal diseases, venereal diseases, respiratory infections, contagious diseases, infectious hepatitis, intestinal parasites, rheumatic fever, and undulant fever. Miscellaneous infectious and communicable diseases encountered occasionally include endemic typhus fever, tetanus, anthrax, glanders, actinomycosis, keratoconjunctivitis, rat-bite fever, leprosy, psittacosis, and hoof and mouth disease.

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MILITARY MEDICAL PROBLEMS

IN

WESTERN EUROPE

I. Public Health and Environmental Factors Influencing Health and Sanitation

1. Public Health Departments

Governmental agencies and facilities for the direction and control of public health activities in the countries of Western Europe had undergone pronounced alterations during the years prior to the outbreak of war. There had been an increased awareness of the necessity for applying sound public health measures to larger numbers of people, and raising the sanitary standards of each country. In some instances these programs had been in effect, in others plans were being formulated. Then, with the advent of war, these plans had to be postponed. At the present time it may be safely stated that all of the countries under German domination have suffered the gradual dissolution of their health and sanitary standards, except where circumstances have forced the Germans to take precautionary measures for their own safety. The same statement is equally true of Germany proper, where the adequacy of medical care and medical and hospital facilities for the civilian population have steadily declined. Coincident with these changes it has been noted that official sanction is now being given to practices which are the direct antitheses of sound medical and public health principles. A knowledge of the structure and effectiveness of the public health service in each country is essential in order to gain a clear picture of present medical and sanitary problems in Western Europe.

a. Germany

State health activities in the Reich are controlled by the Ministry of the Interior; subsidiary to the Ministry are the Reich Committee for Public Health, the Reich Health Bureau, and the Red Cross. Working in close conjunction with these organizations are two divisions of the Ministry of Labor, namely, the Reich Health Insurance and the Reich Land Insurance. Some form of health insurance is compulsory in Germany, therefore these two groups are able to exert considerable influence in promoting public health measures. Either alone or in combination the groups in these two ministries are responsible for maternal and child welfare, industrial hygiene, super-

Footnote

It is impossible to include all the lengthy tables and charts on which much of this survey has been based. A few of the more important ones have been inserted, especially where they could be condensed. Complete tables which are available for study in the Intelligence Section, Office of the Chief Surgeon, are listed in the appendix. No attempt has been made to compile a bibliography for this summary, as it would have been too voluminous. The principal sources of information have been the Medical and Sanitary Surveys of continental countries prepared by the Medical Intelligence Division, Preventive Medicine Service, Office of the Surgeon General, U. S. Army, and material from the files of the Intelligence Section, Office of the Chief Surgeon, S.O.S., ETOUSA. Much of this latter material has been furnished by interested military and civilian agencies who have collaborated in the collecting of medical information on foreign countries.

vision of water supply and sewage disposal, epidemiology and control of contagious diseases, the instruction of public health field officers, the inspection of hospitals, and the development of synthetic foods, drugs, and vitamins. The Reich Ministry of the Interior also controls, by laws and decrees, the licensing of professional medical personnel, and dictates all policies in regard to the care and treatment of the sick. Government control of medical care has grown rapidly especially in the last 3 years, apparently the result of an increasing difficulty in furnishing adequate services to the civilian population. The Reich now employs physicians in the Hitler Youth, the German Labor Front, and other labor organizations, as well as having increased the number of full time public health physicians. A large proportion of doctors are now attached to public or semi-public bodies which provide medical care for large groups, consequently the number of medical practitioners available for individual care is steadily decreasing. Hospitals, already suffering from overcrowding and long waiting lists, have been forced to pool their resources in some instances and accept admissions only through a central admitting office.

Every effort is being made to encourage individuals not to consult a doctor unless absolutely necessary. In some instances preliminary questioning by a nurse is required before being seen by a physician. Some reports indicate that workers must obtain the approval of an appropriate labor official before asking for a medical consultation. Foreign workers in the Reich have a low priority, may receive medical care only under the most urgent circumstances, and then only if the doctor has no other duties.

There has been a definite change in the attitude of public health officials toward certain restrictions on quarantine, food inspection, and water treatment. Wherever shortages of personnel, food or chemicals is marked, an official statement may be released declaring that the need for such rules or restrictions no longer exists, as, for example, tuberculous individuals are allowed to work in factories, or tuberculous meat may be eaten. Further evidence of the deterioration of public health in Germany is given by the increased disease incidence, especially for the contagious diseases and typhoid fever.

b. France

Prior to the German occupation of France, administration of the public health program was the duty of the Departmental Health Inspectors who were responsible to the Minister of Health. The several divisions of the Ministry of Health supervised all activities, and established all policies. In September 1940 there was a complete reorganization of the French public health system. Twenty sanitary regions were created, each of which is headed by a Director of Public Health. The director is granted dictatorial powers in the administration of all matters pertaining to public health and sanitation, as well as control over all medical and sanitary establishments, agencies, personnel, and service, whether public or private. Such unlimited powers in the hands of one individual is apparently the result of German and collaborationist policy.

Those public health measures carried out in France at present are solely for the protection of the Germans themselves. They fear epidemics of any type and have taken steps to prevent their occurrence both in the Army and among the civil population. Shortages of physicians and of all essential medical supplies have made ordinary medical care almost impossible to obtain. Charitable institutions and hospitals for the indigent have been converted for private accommodations, with no provision made for the needy. The steady increase in tuberculosis and typhoid fever, and the increase in infant mortality attest the absence of normal standards of public health.

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c. Belgium

Prior to 1937 public health activities in Belgium were supervised by several uncoordinated departments in various ministries of the National Government. In that year, the first Ministry of Public Health was created and was charged with the following responsibilities:

- (1) licensing of professional personnel;
- (2) health education programs;
- (2) inspection of hospitals;
- (4) supervision of water supplies and sewage disposal;
- (5) supervision of abattoirs and milk distribution centers;
- (6) establishment of housing programs;
- (7) control of communicable diseases.

The Ministry of Health also was active in the fields of industrial hygiene and health and unemployment insurance. State subsidies were furnished to mutual aid societies for the benefit of the lower income groups. The Ministry also furnished public health nurses and traveling clinics for rural areas. Local health activities in cities and communes are supervised by the Ministry of Health, implemented by the work and assistance of local physicians and sanitary engineers.

The present Belgian public health organization retains much of the structure that existed before the war. The principal change has been in personnel, since collaborationists have been given most of the key positions. Loyal Belgians have been retained in a few instances, largely because of their knowledge and ability, and the difficulty in finding adequate replacements among the sympathizers. All previously existing rules and regulations governing public health are now supplanted by National Socialist doctrines and decrees.

As in other countries, the civilian population has borne the brunt of the changes which have occurred. All preventive medicine activities have been considerably curtailed except under threat of epidemics. Conscription of physicians has put an added strain on the remaining practitioners in Belgium, resulting in less effective medical care. This, combined with the shortage of food and drugs, has added to the general deterioration of health and strength of the people.

d. The Netherlands

The situation in the Netherlands is somewhat analogous to that described for Belgium. The basic structure of the public health organization has been maintained in form, but not in function or effectiveness. The State Public Health Service has as its chief a Director General, who is responsible to the Ministry of Social Affairs. Acting as an advisory group to the Government and the various Ministries is the Central Council of Public Health, with a membership of 70, formerly made up of Government appointees, physicians, various public health specialists, and interested civilians. The Director General, assisted by several chief inspectors, is charged with the control of infectious diseases, enforcement of quarantine regulations, hospital inspection, enforcement of regulations governing the practice of medicine and pharmacy, direction of the maternal and child welfare program, inspection of food, and management of the campaign against tuberculosis. There was a separate veterinary service in the Ministry of Economic Affairs.

Every city and township had a municipal public health service which was directed and supervised by inspectors from the Central State Public Health Service. The work of these municipal units was greatly facilitated by the presence of many regional and central laboratories. (See Sec. II, 3). The

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Public Health Service also gave aid to those private enterprises which strove to improve the health and sanitary standards of the country. Very favorable results had been obtained from this organization, and general health statistics for Holland compared favorably with the best figures of other countries.

The substitution of German and Dutch Nazi personnel has had a markedly adverse effect on public health in the Netherlands, and what is being accomplished is only through the aid of the closely knit organization of loyal Dutch physicians.

e. Denmark

According to best reports, the Danish National Health Service has suffered relatively little change since the German occupation. Services have continued much as before, and it is stated that most of the regular personnel are still actively engaged in their respective jobs. The presence of a more or less normal state of affairs is borne out by the fact that up to the present time Denmark has suffered less from disease than any of the occupied countries.

The National Health Service is the central authority for the maintenance and supervision of hygienic standards. There are subsidiary offices which deal with problems of drinking water supplies, control of food, sewage and drainage, sanitary regulations, and building and sanitation of dwellings. There are also departments for maternal and child welfare, care of the aged, industrial hygiene, epidemiology, vital statistics, and the preparation of biologicals.

There are 23 health districts, in each of which a District Officer of Health is responsible for the supervision of all health activities. Municipal boards of health are found in towns and rural districts, each of which comes under the control of a District Officer of Health.

Up to the time of the war, the Danish Government had made considerable progress in social reforms. Over 80 percent of the population were subscribers to the National Insurance Act, which furnished sickness and accident benefits. Approximately 7 percent of the National budget was allotted for subsidizing hospitals and health services. The present situation in regard to these points is not known.

f. Norway

Public health activities in Norway are under the Ministry of Social Welfare. The Surgeon General of the Public Health Service heads the medical work of the Ministry and supervises all Government health activities. Among the divisions of the Public Health Service are units for the control of tuberculosis and for the care and study of mental diseases. The Surgeon General is assisted by members of the medical faculty of the University of Oslo, who act as special consultants. The policies of the Central Administration are carried out through Provincial and District Health Officers. These officers head local Boards of Health, elected by county councils, and with the boards, supervise public health measures and social security programs, and make sanitary inspections. Provincial and District Medical Officers, though well trained, usually are not employed full time, and may also engage in private practice.

The present resident Surgeon General and head of the Public Health Service is a member of the Nasjonal Samling, or "Quisling" party; he is reported to receive little help or encouragement from loyal physicians. It is believed that the great majority of physicians, including those in the Public Health Service, are loyal, and form a trustworthy framework for the safeguarding of

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national health. In spite of obvious difficulties, the individual officers continue to carry out all functions possible. The greatest difficulties have arisen in the cities during epidemics of contagious diseases. Hospitals are unable to care for all cases, and control measures are difficult to apply.

2. Water

With the possible exception of parts of Belgium, all of Western Europe has an abundance of natural water sources. Water varies in its mineral content and degree of bacterial contamination, depending upon its origin and the point in the water course from which the supply is drawn. Such water is not always entirely satisfactory for use in distribution systems, and, as in Belgium, supplies may have to be piped considerable distances.

a. Germany

Up to the time of the war, Germany was considered to have the most satisfactory water supply systems in Europe. Deep wells were the usual source. These provided a safer natural supply than is possible when ground or surface water is used. Only in larger cities was water taken from rivers and streams. Filtration and chlorination were employed routinely in most of the distribution units. In the last two years there has been an increasing shortage of essential chemicals, and sufficient chlorine could not be spared for use in water works. An official decree of April 1943 by the Reich Ministry of the Interior authorized pumping of river and lake water directly into mains without benefit of treatment. Even boiling of impure water is difficult at present, because of the fuel shortage. Bomb damage has undoubtedly caused considerable impairment of water distribution and purification facilities in some of the cities. Private wells have been sunk in many localities in order to be prepared for the possible destruction of ordinary water systems. In the rural regions wells and cisterns are common. Ordinarily, wells were carefully inspected for construction and location with a view to insuring pure water. It is doubtful if such inspection standards are still in effect. Under present circumstances the water in Germany is of questionable purity and should be tested or treated before use.

b. France

The majority of the natural water supplies in France are contaminated and unfit for human consumption. This is in part accounted for by the lack of sewage disposal facilities in rural areas and by farm practices of the large agricultural population, as well as by the fact that the ground water is high, and easily contaminated. The most frequent methods of purification of water are decantation, slow filtration, and/or ozonization. Alum coagulation is occasionally used. In some municipalities chlorination is employed, principally by the processes of "Javellization" and "Verdunization", neither of which is considered entirely satisfactory. Much of the water is hard and leaves heavy deposits, especially in boilers and similar types of machinery. In some areas this residue is quite corrosive. Cities occasionally provide a dual water supply, a treated source being used in private homes, and an untreated source for industrial purposes.

c. Belgium

In Belgium the principal sources of water are the sandy subsoil, natural springs, rivers, and canals. Of these sources springs are considered the most satisfactory, however they are rarely found except in the hilly part of the country south of Brabant and Hainaut, and in the provinces of Liege, Namur and Luxembourg. Sources other than springs ordinarily contain considerable amounts of suspended organic material, and can be considered gross-

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ly contaminated. Contributing factors are the dense population and lack of adequate facilities for disposal of domestic and industrial wastes. In 1938, 33 percent of the communes had organized central water supply systems. Two thirds of the residents of these communes, or 40 percent of the total population of the country were connected with the systems. Treatment facilities consisted of sedimentation and rapid and/or slow sand filtration where available. Where chlorination was employed, the usual method was "Javellization", which is inferior to the use of liquid chlorine. Under present conditions, with partial or complete disruption of normal facilities in many areas, no untreated water can be considered safe for human consumption.

d. The Netherlands

Water supplies in the Netherlands have produced some particularly difficult problems. The most satisfactory source is the dune water. In the area adjacent to the North Sea, dune water occurs in two separate layers, a superficial layer and a deep stratum immediately overlying salt water. The latter replenishes the superficial layer. In the larger cities, increasing demands on the dune water supply have exhausted the superficial layer in many areas and made it necessary to draw on the deeper layers as well. Where the deep layer has been sufficiently depleted, the underlying salt water rises to such a height that varying degrees of salinity are produced in the drinking water supplies, occasionally making them unfit for use. Under present circumstances the total quantity of water removed from the dune area by various city water supplies is considerably in excess of the amount which can be replaced by natural rain water. This has resulted in a number of the cities resorting to rivers, lakes, and ground water for their supplies. These sources are almost universally contaminated. This is especially true of the Rhine and Maas river which pass through the highly industrialized areas of Western Germany and carry both sewage and factory waste. An additional source of satisfactory water is the IJsselmeer, the large lake left by the reclamation of the Zuider Zee. This lake has gradually grown less salty until its chloride content in 1941 was 125 p.p.m., a figure which is considered compatible with satisfactory drinking water standards. A regional provincial waterworks in North Holland is ready to use this source, although the Amsterdam waterworks believes that the chloride content is too high, and warns of later variations in salinity. Water purification in the Netherlands consists mainly in sedimentation, filtration through gravel (65 cm. of gravel per hour) and slow sand filtration (10 cm. of sand per hour). Chlorination is usually considered to be superfluous and only a few small water plants use this process. Details of some of the water supply systems in the Netherlands are shown in Table I.

TABLE I

Water Supply Systems *

The Netherlands

Source - Medical & Sanitary Data on The Netherlands
Medical Intelligence Division, Preventive Medicine Service
Office of the Surgeon General, U.S. Army

Amsterdam (1940)	Municipal - a. 249 wells about 131 feet deep in dune area; annual supply 6,600,000,000 g. b. Shallow wells near Hilversum (heather area); annual supply 448,000,000 g.
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Amsterdam	(1940)	c. Surface water from the Loenerveen pools which act as sedimentation basins for water from the river Vecht; if necessary the excess water from the adjacent Bethune polder is pumped over into the Loenerveen pools; annual supply 3,828,000,000 g. Slow sand filtration and aeration to remove manganese. One reservoir: capacity 2,600,000 g. Annual consumption 23.2 g.p.c.p.d. after deduction of water used by industry.
Apeldoorn	(1929)	Municipal - 12 wells 82 to 157 feet deep; no treatment: two tanks; total capacity 211,000 gallons. Consumption 9.5 g.p.c.p.d.
Arnhem	(1929)	Private (Arnhemsche Waterleiding Mij): 94 wells, 33 to 230 feet deep; no treatment; one reservoir and one water tower. total capacity 449,000 g. Consumption 20 g.p.c.p.d.
Dordrecht	(1929)	Municipal - surface waters slow sand filtration: one water tower capacity 132,000 g. Consumption 30 g.p.c.p.d.
Eindhoven	(1929)	Municipal - 16 wells 115 feet deep; slow sand filtration one water tower and one reservoir: total capacity 370,000 g. Consumption 13 g.p.c.p.d. 0.05 mgm. iodine per l. water is added.
Enschede	(1929)	Municipal - 60 wells 39 to 49 feet deep; slow sand filtration, one water tower: capacity 160,000 g. Consumption 15 g.p.c.p.d.
Groningen	(1929 1936)	Municipal - 22 wells about 197 feet deep, and river water aeration, Ca (OH) ₂ sedimentation, rapid sand and slow sand filtration; three water towers; total capacity 442,000 g. Annual supply 937,000,000 gallons.
Haarlem	(1929)	Municipal - 340 wells about 49 feet deep; slow sand filtration: one water tower with a capacity of 317,000 . 15.6 g.p.c.p.d. in 1921: 11.3 g.p.c.p.d. in 1936.
Hilversum	(1929)	Private (Utrechtsche Waterleiding Mij): 36 wells 43 to 79 feet deep; no treatment: one water tower: capacity 159,000 g. Consumption about 100 g.p.c.p.d.
Leiden	(1941)	Private (N.V. Leidsche Duinwater Maatschappij): dune water slow sand filtration. Since 1940 dunes are irrigated with 264,200,000 g. fresh surface water derived from a nearby watershed: annual consumption 792,600,000 g (28.2 g.p.c.p.d.)
Maastricht	(1929)	Municipal - 2 wells 28 feet deep and one well 33 feet deep connected with infiltration gallery: no treatment one tank holding 108,000 g. consumption 22 g.p.c.p.
Nijmegen	(1929)	Municipal - 45 wells 197 to 230 feet deep in Kronenburgpark: no treatment two natural reservoirs; combined capacity 793,000 g. Consumption 23 g.p.c.p.

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Rotterdam (1929) Municipal - Maas River water: prefiltration through gravel (65 cm. p.h.) followed by slow sand filtration (10 cm. p.h.) one reservoir and two water towers. Combined capacity 2,600,000 g. Total consumption: (1938) Rotterdam proper, 8,140,000,000 g. per year (36.7 g.p.c.p.d.) Rotterdam, with suburbs 9,440,600,000 g. per year.

The Hague (1940) Municipal - dune water. Total consumption 3,818,000,000 g. per year (17.8 g.p.c.p.d.)

Tilburg (1929 1938) Private (Tilburgsche Waterleiding Mij): 60 wells 82 feet deep: rapid sand filtration and aeration. Total reservoir capacity 423,000 g. Consumption 27 g.p.c.p. of which nearly 60% is used for industrial purposes.

* g.p.c.p.d. = gallons per caput per diem.

e. Denmark

In Denmark most water is taken from deep wells and springs; less often from static surface sources and rivers. Water is plentiful, though shortages from droughts may be experienced in the areas around Hobro, Naksbo and Mariager. There is a year round shortage of domestic water at Svaneke and Aarskøling. The water is hard and frequently has a high content of carbonate especially in the south eastern portion of the country. Water supplies in cities are filtered and sometimes oxygenated, but very little chlorination is used except in the city of Copenhagen. In spite of this, water supplies usually are perfectly safe as the Government carries out regular testing. Satisfactory supply outlets are labelled "drinking water". The generally low figure for enteric diseases indicates the probable satisfactory state of Denmark's water supply situation.

f. Norway

In Norway there are a great number of lakes and streams, many of which derive their water from uncontaminated and uninhabited watersheds. Consequently the problem of obtaining safe water is usually not great. The islands and coastal areas of Norway are supplied by wells which are adequate for the needs of the local population. Wells in these localities would furnish insufficient quantities of water for any invasion force. This water varies in its bacterial content and should not be considered safe for human consumption until treated or until tests have proved its bacteriologic safety. In the coastal fjords and valleys the water which is obtained from the upper parts of the rivers is excellent and can be considered pure without treatment since the watersheds are uninhabited. In the lower courses of the rivers opportunity for contamination increases, and all water is considered unsafe without chlorination. In the mountain areas water is abundant and universally safe except in a few isolated localities where the watershed is inhabited or used for grazing. In the eastern inland valleys which are most populated all water is considered contaminated and requires treatment before use. The same is true of the eastern lowlands. Water supplies in these areas usually are obtained from rivers and lakes. In the cities natural water supplies are considered unsafe without treatment. Prior to the war the Norwegian Government was actively engaged in installing chlorination facilities in most of the principal cities, but it is probable that this program has been impeded or entirely stopped under present conditions. Lack of chemicals and other critical materials make it certain that these water supplies cannot be accepted for use without additional treatment. In some instances dual sources of water are

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used for a single town and water from only one source will be chlorinated. Cross connections between the two systems necessarily result in contamination of the entire water supply.

Repeated instances have come to light where retreating German forces have contaminated or destroyed water supplies and installations. The favorite methods of contamination have consisted of dumping into wells an odd assortment of materials including lubricating oil, Diesel oil, machinery, manure, garbage and human wastes, and bodies of dead animals. The Germans also have used bone oil for this purpose. This oil is toxic only in fairly low dilution but retains its extremely unpleasant odor and taste in high dilutions. Removal of this contaminant is difficult under ordinary circumstances.

It is apparent that any water supplies in areas formerly occupied by German troops may either be totally destroyed, or contaminated by the methods described above. Care should be taken that all water sources are thoroughly examined and tested before use.

3. Sewage

The applied methods of disposal of sewage and human waste on the Continent of Europe vary widely in the different countries and in rural and urban areas. General sanitary standards in Western and Central Europe, with the possible exception of Germany, have never equalled those which exist in the United States and England.

a. Germany

Prior to the war the great majority of German city dwellers were supplied with piped water-borne sewage disposal systems nearly all of which employed some form of treatment before final disposal. The customary methods used were screening, sedimentation, filtration, activation, or application of chemicals. Street cleaning and rubbish removal were regulated and controlled by the State with highly satisfactory results. In the rural areas of Germany sanitary conditions were considerably less satisfactory. Many types of private septic tanks etc., were to be found although indiscriminate soil pollution was not practiced. It is not known whether because of war shortages human excrement is now being used in lieu of manufactured fertilizer.

b. France

France is very poorly supplied with sewage disposal facilities. In cities the systems are for the most part efficient, but the number of connections is insufficient thus leaving many of the inhabitants without accommodations. Paris sand filtration beds are used in the treatment of sewage. No information is available on other cities. Again, rural areas resort to privies, cesspools and septic tanks. Normal sanitary standards are not maintained. Human wastes are collected and stored for use as fertilizer, which results in varying degrees of pollution of soil and water.

c. Belgium

In 1938, 19 percent of the communes, and 63 percent of the population of Belgium had closed, water-borne sewage disposal systems, though treatment facilities were rare. In the rural areas, methods were more antiquated; privies, bucket latrines, and septic tanks were the common methods of waste disposal. As is characteristic of the Continent, wastes are usually stored for use as fertilizer. Poorly constructed storage cisterns allow for leakage and constant pollution of the soil, and constitute excellent breeding places for flies.

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d. The Netherlands

In the Netherlands sewage disposal is complicated by the fact that 38 percent of the country is below sea level, in addition to which 20 percent of the surface area is water. The dense population has increased the difficulty. Until recently such sewage systems as existed provided no treatment facilities and emptied directly into neighboring rivers or lakes. Treatment plants employing activated sludge and alum precipitation have now been installed in Bussum, Tilburg, Utrecht, Leiden, Haarlem, Vucht, Zaandam, Lochem, Borculo, Eibergen, Groenlo and Winterswyk. Many industrial plants have also installed systems for the management of their own industrial waste problems. Conditions in rural areas are similar to those in the countries previously mentioned.

e. Denmark

A somewhat similar situation prevails in Denmark where most of the larger towns maintain water-borne sewage disposal systems. When treatment is employed it is either by the activated sludge or trickling filter methods. Copenhagen has a water-borne system, but the effluent empties into the sea untreated. As in France and Belgium, night soil is collected, usually in cesspits, and, after digestion, is used for fertilizer.

f. Norway

Norway has only one sewage treatment plant which is located in Oslo. This is necessitated by the sluggish flow and shallowness of the inner fjord on which Oslo is situated. Most other Norwegian cities have water-borne systems in which the effluents empty directly into rivers or the sea without benefit of treatment. In some of the rural localities septic tanks are common, while in others night soil is collected for use as fertilizer.

Bomb damage in the principal cities of Western and Central Europe can be relied upon to have interfered considerably with sewage disposal facilities. In addition, there remains the constant menace of cross contamination between water mains and sewers cracked or otherwise damaged by bombing. The frequent occurrence of localized outbreaks of typhoid fever is at least partial proof that normal facilities have broken down. Untreated water in urban or rural areas is a potential source of enteric infections because of soil pollution and unsatisfactory waste disposal facilities and methods.

Sewage systems, when they exist, are not capable of accepting large overloads. Army units should provide for unit disposal of all waste products until the capacity and usability of local facilities can be ascertained.

4. Insects and Animals of Importance to Man

a. Mosquitoes

(1) Anopheles

(a) Anopheles labranchiae atroparvus

This species is the malaria vector of importance in Denmark, Germany, Holland, Belgium, France and in several other countries of Europe. It is not recorded in Norway. A. labranchiae atroparvus breeds in salty or brackish water, optimum reproduction occurring in water with a salinity of between 0.25 percent and 0.99 - 1.15 percent. In nature breeding does not take place in fresh water except in the southern part of the area in which the species occurs. The mosquito is found throughout Western Europe, but is

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most prevalent in the marshy coastal areas from East Friesland south to the bulge of France. The mosquito in the adult stage cannot be differentiated with certainty from the other species belonging to the maculipennis complex, of which there are several in Northwestern Europe. Species determination can be made by examination of the eggs. The adult mosquitoes choose warm places for semi-hibernation, usually houses, and take occasional blood meals throughout the winter. Egg laying is suspended during this time. A. atroparvus is responsible for the spread of house malaria in the spring when no infected adult mosquitoes are present, as well as for the usual summer and fall cases. It does not transmit malaria over all of its range, but only under certain conditions when the adults are not deviated from man by stabled animals or other factors. It represents, however, the principal and most dangerous malaria vector in Western Europe. (See Section III, 1, d.)

(b) Anopheles messeae

This mosquito is fairly common throughout the whole of Western Europe, probably ranking second to A. atroparvus. The larvae are found in cool standing bodies of fresh water in large inland river valleys, lakes and marshes. Adults appear to be zoophilous, but during the period of winter hibernation in barns and houses these mosquitoes may bite man. A. messeae is relatively unimportant in the transmission of malaria in Western Europe. It does not assume real importance except in the Danube valley region of the Balkans.

(c) Anopheles maculipennis

The larvae of A. maculipennis breed in fresh water in hilly sections and is found throughout Scandinavia and Europe. It is unimportant in the transmission of malaria except in the Balkans and adjacent portions of Russia.

(d) Others

In addition to the three anophelines listed above, there are five other species which may be encountered in Central Europe and the Balkan area. Most important of these are A. superpictus and A. sacharovi. Of less importance is A. claviger which, although fairly plentiful in Europe, especially in Germany and the Balkans, does not seem to be important in the transmission of malaria outside of Palestine and Syria. A. algeriensis and A. plumbeus, wherever found in Europe, are of no importance as malaria vectors.

(2) Aedes

Several species of Aedes mosquito are found in Western and Central Europe. Aedes aegypti, the commonest transmitter of dengue fever and yellow fever, is not especially numerous in Europe except in the Southern part and the coastal areas. This mosquito is domestic and normally breeds in such artificial collections of water as rain-barrels, old tin cans, tire cases, gutters, drains, etc. Several other species of Aedes, including A. vexans, A. dorsalis, A. punctator and A. communis are pestilential mosquitoes in many areas of Western Europe. A. punctator and A. communis are especially prevalent in Norway. They are vicious biters and are present in fairly large numbers throughout the warm months. A. vexans is most prevalent in Northwestern France and Western Germany. A. dorsalis is widespread in Scandinavia, Denmark and Germany. A. detritus is found along the coasts of Western and Southern Europe.

(3) Culex

In Europe Culex mosquitoes are important only as biting pests, the two principal species being C. pipiens and C. molestus. Additional species include C. annulatus, C. dorsalis, C. annulipes and C. cantans.

(4) Others

Several species of mosquitoes of the genus Mansonia are abundant in Europe, except in the far North. They are pests only. Theobaldia annulata is an important pest in Northern Europe. In the Netherlands area Tendipes plumosus constitutes a severe nuisance in the summer months, especially in the region of the IJsselmeer.

b. Flies

(1) Musca domestica

The common housefly is the most troublesome and widespread species of fly in Western Europe. It is a serious problem in Denmark and in rural localities in France, Belgium, Holland and Germany. The insect is closely associated in these countries with the dairying and hog-raising industries. In the former, milk supplies are likely to be heavily contaminated by flies. These insects are mechanical carriers of the enteric diseases, eye diseases, and possibly poliomyelitis. In the opinion of some observers they may play a part in the transmission of acute infectious hepatitis.

(2) Gasterophilus species

Several species of the horse bot flies are present in the countries concerned. They are of little medical importance but in rare instances penetration and migration of larvae under the skin produce irritating, tortuous wheals several centimeters in length.

(3) Tabanus and Chrysops species

Horse flies and deer flies are abundant in the Scandinavian peninsula, and Denmark. They breed mostly in marshy accumulations of water and along streams. During the summer months they may become troublesome and species of the latter genus have been incriminated in the transmission of tularemia.

(4) Stomoxys calcitrans

The stable fly, when numerous, may be an exceedingly annoying biting, blood-sucking pest of man and of various domestic animals. These flies are numerous in countries in Europe as far North as Denmark and breed mostly in manure and damp straw contaminated by urine.

(5) Hydrotoea irritans

The "plantation fly" is a non-biting but irritating pest in that it attempts to feed on secretions around the eyes and nostrils of man and animals. The fly develops in the faeces of wild animals. It is reported principally from Denmark.

(6) Several species of Morellia and the species Musca autumnalis develop in the dung of cattle and are irritating in the same manner as Hydrotoea irritans.

(7) Simulium species

Simulium species are common pests in all of the countries of Northwestern Europe. They are biting pests of prime importance in Norway, Denmark, and Germany. The larvae develop below the surface of flowing water, attached to rocks or vegetation. Simulium reptans columbaczense, the Golubait fly, is a species that is especially troublesome in Southern Germany and in local areas in adjacent Balkan countries in the vicinity of the Danube.

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(8) Phlebotomus

Phlebotomus in the Western European countries are important pests only in Southern France, where the most common species are P. perniciosus, P. papatasi and P. sergenti. P. perniciosus is responsible for the transmission of kala azar in this region, P. papatasi being relatively unimportant. P. sergenti is not a proven carrier.

(9) Culicoides

A number of different species of "midges" may be important pests in localized areas from Norway southward through the other countries of Western Europe. In many localities dense swarms of the tiny midges attack man. Their bites produce irritating and itching local lesions and, occasionally, systemic reactions. Usually Culicoides develop in standing water in which organic debris is abundant.

(10) Calliphoridae

Flies of the genera Lucilia and Phormia may deposit eggs that will develop as larvae in wounds. The larvae of the species of calliphoridae found in the six countries do not normally tend to destroy living tissue in wounds, but feed instead on necrotic tissue and accumulations of materials in wounds.

c. Lice

In the countries concerned, lice are probably the insects of greatest medical importance. The crab louse (Phthirus pubis), the head louse (Pediculus humanus capitis), and the body louse (Pediculus humanus corporis) are specific insect parasites of man. Their entire life cycle is spent on man's body or in his clothing. They cannot breed off their host. All species are important from a military standpoint because of the irritation, loss of sleep, and predilection to secondary infections caused by their bites. Head lice and body lice transmit typhus fever, trench fever, and relapsing fever. While louse infestation was not particularly prominent in this section before the war, all reports indicate that the percentage of lousiness has increased tremendously. The principal predisposing factors are overcrowding, and lack of soap, clean clothes and facilities for delousing. Louse infestation has reached alarming proportions on most of the German war fronts. On the Eastern front prodigious control efforts are being made. Prisoners, casualties, and troops returning to Germany cannot pass a given line without thorough disinfection of body, clothing, and equipment.

d. Fleas

The fleas that might transmit disease in the Western European countries are as follows:

<u>Xenopsylla cheopis</u>	- oriental rat flea
<u>Pulex irritans</u>	- human flea
<u>Ctenocephalides canis</u>	- dog flea
<u>Ctenocephalides felis</u>	- cat flea
<u>Neopsyllus fasciatus</u>	- European rat flea

In Germany alone over 50 species of fleas occur, but the list above includes most of the species that ordinarily attack man. There are no records of X. cheopis in Norway. The principal diseases transmitted by fleas are endemic (murine) typhus fever, and plague (See Section III). They may also transmit tularemia from rat to rat, but have not been known to infect man with this disease. The sand flea, Tunga penetrans, is not seen.

e. Ticks

(1) Rhipicephalus sanguineus

Perhaps the most important tick species in the six countries is Rhipicephalus sanguineus, the brown dog tick. This tick is probably absent from most of Northern Europe, but is present in the Southern part, especially Southern France where it is the vector of the typhus-like Marseilles fever or "fievre boutonneuse".

(2) Ixodes ricinus

Ixodes ricinus occurs in Germany, Belgium and France, attacks animals and man, and produces a form of tick paralysis in children.

(3) Ixodes hexagonus

Ixodes hexagonus attacks man and animals in Central Europe, but is not a vector of disease.

f. Mites

(1) The "chigger" or "harvest mite" of Europe is Trombicula autumnalis (Shaw). In the larval stage the mite is an irritating temporary external parasite of man and of nearly all kinds of vertebrate animals. The common Trombicula of Europe is not a known transmitter of diseases of man as are some of the Trombiculinae in other parts of the world. The nymphs and adults of Trombicula are saprophytic and found in soil that contains organic debris. The mites are acquired by men walking through infested vegetation or coming in contact with infested straw.

(2) Sarcoptes scabiei var hominis

Sarcoptes scabiei var hominis, the itch mite of man, occurs in all of the countries. Its incidence has risen sharply since the war.

(3) Liponyssus bacoti

Liponyssus bacoti, the tropical rat mite, occurs in Southern Europe and has been recorded as attacking man in Hamburg, Germany. This mite transmits endemic typhus from rat to rat, and may be able to infect man.

g. Scorpions and Spiders

(1) The scorpions of Europe occur in the Southern part of the Continent and are not of great importance.

(2) A species of spider which belongs to the same genus as the American black widow spider and which is quite poisonous is Latrodectus tredecimguttatus. It is found in Southern Europe.

h. Cockroaches

(1) Blattella germanica, the "croton bug" or German roach, is abundant and troublesome in Europe.

(2) Blatta orientalis, the oriental roach, is the species of secondary importance.

(3) Periplaneta americana, the American roach, is restricted mostly to Southern Europe, but may be found in any of the ports.

i. Rats

The brown sewer rat, Rattus norvegicus, is very prevalent in Western Europe, especially in coastal and port areas. The black house rat, R. rattus rattus is almost equally common. Both of these species may harbor plague and infected fleas.

j. Snakes

The true vipers, genus Vipera, are the only poisonous snakes to be found in Europe. Some of their characteristics are a vertical pupil, relative small size, and a zigzag dark stripe down the middle of the back. The common species are Vipera berus (throughout Europe, and southward to the Pyrenees and Appenines), Vipera Ursinii, (Southern France, Hungary, Yugoslavia) Vipera aspi (Southern France, Yugoslavia), and Vipera ammodytes, (Austria and the Balkan States). Casualties from snakebite will rarely be encountered.

k. Others

Numerous species of bees, wasps, moths, beetles and ants which are similar in habits to those found in the United States and which have painful stings, urticating hairs, or vesicating secretions, are found in the various European countries. The bedbug, Cimex lectularius, is common in Central Europe and is thought by some investigators to be capable of transmitting typhus fever.

5. Food and Nutrition in Relation to Health

The countries of Western Europe, though highly industrialised in certain areas, nevertheless have a large agricultural and pastoral population. In normal times they are able to produce a substantial portion of their own food supplies, while some items are produced in quantities sufficient for export. The present conflict probably has had a more profound influence on food supplies and nutrition than on any other phase of civilian life in the occupied countries. There has been a marked diminution in the quantity of food available and in its qualitative adequacy. There are several factors which apply in a general way to the entire area. Foremost, is the shortage of farm labor which has been caused by the conscription of so many individuals into the German Labor (TODT) Organization. This conscription has been felt most acutely in France and to a less extent in the Low Countries, Norway and Sweden. Second, the difficulty experienced in transporting food great distances because of the disruption of rail and freighter service by military action and the priority given to the movement of men and material. Third, and perhaps equally important, is the fact that Germany has continued to confiscate large quantities of food from all the occupied territories. Under such a system it is obvious that food supplies in Germany will be better than in any of the surrounding countries. While specific information is lacking, it is known that Germany's food position actually has shown improvement during 1943 and that supplies of grain and animal fats have increased.

The caloric value of the ration in Germany and the occupied countries is given in the accompanying table. The first column denotes information received from physicians who are nationals of the countries listed; the second group of figures was furnished by the Agriculture and Standard of Living Section of the Office of Strategic Services of the United States Government.

		<u>calories per day</u>
Germany	-	2784
France	1100 - 1400	2431
Belgium	1250	1713
The Netherlands	1400	2461
Denmark	2800	3283
Norway	1600 - 1800	1980

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The prevalence of malnutrition, deficiency diseases and marked weight loss is hardly compatible with the higher figures, which, in some instances, represent almost normal amounts, and it is difficult to see how life is maintained on the lower estimates. Yet the French and Belgians have made the statement that some individuals do not manage to get 1000 calories per day. It is possible that the higher groups are German official ration figures. If so, they are misleading since such amounts are difficult or impossible to obtain in the open market. The correct value of the ration probably lies between these two, and nearer the lower group. It must be borne in mind that only by use of the black market and similar subterfuges is the average city dweller able to sustain himself.

Despite the fact that Germany has recently begun to confiscate foodstuffs from Denmark, the position of this country is superior to any other in the occupied group. Serious nutritional disturbances have not made their appearance and malnutrition has received no special mention although the diet is probably below the optimal level. In Norway, the diet has been carefully arranged (by the Norwegians) in order to provide an excess of calories up to the age of 7 years. After this time the caloric value of the ration decreases in proportion to the theoretical optimal value, so that children of 9 years receive 370 calories less than normally required, while the diet of the heaviest workers is 2300 calories less than the estimated norm. As in all rationed countries it is difficult, and sometimes impossible, to obtain the regular allotments.

In the Low Countries and France confiscation of food is especially severe and it is in this region that the ration is most inadequate. The Dutch receive for their own use only 10 percent of the food they raise, the remainder going to Germany or the occupying troops. All foods are scarce, and the diet is grossly inadequate in quality and quantity. Only with the working classes is malnutrition prominent, though deficiency diseases are common in the younger age groups. The situation in Belgium is somewhat improved over 1941 and 1942, but there are a great many individuals who do not receive an average of 1000 calories per day. Malnutrition, deficiency diseases and retardation of the growth in children are common. A similar situation obtains in France where the shortage of food is also acute. Shortages are reported to be much worse in the southern part of France than in the north, and health has been seriously affected.

In all the occupied areas the black market flourishes. In Norway it is designed solely to enable farmers to supply urban relatives and friends with items otherwise unobtainable. In the Netherlands the black market is only for the benefit of the occupying forces or the very rich. Regardless of how it operates, the black market has helped to supplement the diet of many individuals, especially in urban areas. Farmers fare better as a rule and are believed to hold back or hide requisitioned food for their own use and the use of friends.

Poor grain crops have contributed markedly to the poor nutritional picture. However, it is reported that the 1943 grain harvest in Denmark was 3.9 million tons, as compared with 3.8 million tons in 1942, and 1935 - 38 average of 3 million tons. Vegetables are still raised in considerable quantities though not sufficient to supply the tremendous needs of both Western and Central Europe. Crops for 1943 in Northern Europe are expected to be good, while those of Southern Europe have been adversely affected by drought. Gardeners and farmers in the rural areas normally use human waste as fertilizer and this practice has probably increased since there is now a lack of suitable chemical fertilizers. This accounts, in part, for the increased frequency of enteric diseases in the occupied areas. The most needed foods at the present time are meat, oils, cereals and dairy products.

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The increasing difficulty in obtaining food has had a marked effect on morale. Constant hunger, weakness, loss of resistance to infection, inability to work, and numerous other complaints among the people have led most of the authorities from the occupied countries to the conclusion that furnishing an adequate amount of foodstuffs is one of the principal tasks of the armies of liberation. Since these countries have a large agricultural area, aid in planting crops and restoration of dairy herds will be of inestimable value in returning these nations to a self-sustaining position.

Milk and dairy products also have become scarce in all of Western and Central Europe. Dairy herds suffer, to a large extent, from lack of suitable fodder and some animals have had to be slaughtered. Tuberculosis in cattle has increased markedly, as has contagious abortion. In most areas careful supervision of slaughter houses and thorough inspection of all meat offered for human consumption was a normal pre-war practice. At the present time the need for food plus the lack of manpower and testing facilities has almost stopped sanitary control. Even in Germany meats are offered for sale which are grossly infected with tuberculosis, and the incidence of diseases transmitted by infected meat (tuberculosis, trichinosis and tularemia) has risen considerably. Less difficulty has been experienced in this regard in Denmark but it is likely that even here conditions have deteriorated. In some of the larger cities facilities for cold storage still exist, but in comparison with actual needs the available space is insufficient.

Pasteurization of milk and dairy products has never been practised to an appreciable extent on the Continent except in Denmark and Norway. At the present time only Denmark maintains such facilities. The usual method employed is flash pasteurization, which is considerably inferior to the process used in the United States. It is safe to say that all milk obtainable at the present time is unsafe for human consumption unless boiled, and is not recommended for use by military forces under any circumstances. Other dairy products such as butter and cheese, while less dangerous than whole milk, also must be considered potential sources of disease.

If one may draw a composite picture of the food situation in Western and Central Europe conditions will be found to be most satisfactory in Germany, Denmark and Norway. Spreading outward from this central area food supplies in the occupied zones steadily diminish in quantity and quality. Correction of this important deficiency is of paramount importance in the rehabilitation of the entire area.

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II. Medical Facilities

1. Hospitals

a. Number and capacity

Since the advent of war, there has been an apparent decrease in civilian hospital facilities in continental Europe. This has been due to the increasing demands of war, both in Germany and in occupied territory. Hospital accommodations have been increased in many areas, such as Vienna, Munich and Breslau, which now have become medical centers for the treatment of German wounded. Such expansion is frequently at the expense of a civilian population which has a greatly increased sickness rate, but which has seen its available medical facilities diminish steadily. Only by considerable expansion and crowding of present space has it been possible to furnish anything approaching decent hospital care for the more serious cases. Because of the constant demand for additional hospital care, it has been necessary for the German high command to find additional locations outside of Germany for housing ill, wounded, or convalescing soldiers. It is rumored that hospitals have been commandeered in Hungary and Bohemia-Moravia. The Grand Duchy of Luxembourg has had its medical facilities almost doubled in order to help care for war casualties from the eastern and southern fronts.

In all the countries of Western Europe, the German authorities have taken over such hospitals as they needed, with little regard for local requirements. Hospital supplies have been stripped from many places and either transported to Germany or used to supply local German installations. With the exception of physicians, the staff of commandeered hospitals are usually required to remain and carry out their work under German supervision.

There has been a marked shortage of such hospital supplies as linens, gauze, and dressings of all types. German medical authorities have repeatedly cautioned against the danger of using too much of these materials and have issued instructions as to the frequency with which dressings shall be changed. Dirty or contaminated dressings often are washed, sterilized, and used again.

There is also a considerable shortage of motor transport for use as ambulances. This has greatly hindered the movement and transfer of patients. When patients are discharged from the hospital it is necessary to carry several in the same conveyance. The police have been assisting in the transportation of sick individuals, both to and from the hospitals.

Waiting lists exist for nearly all hospitals receiving civilian patients. This is especially true in Germany, France and the Low Countries. Waiting lists are more likely to be found for the chronic diseases such as tuberculosis. Four or five months may be required to have an open case of tuberculosis accepted for a sanatorium. Many individuals try to enter hospitals in the hope of obtaining better rations, but it is frequently the case that the food in hospitals is less plentiful and less palatable than that obtainable outside.

Up to the present time there has been little if any destruction of hospital facilities. While supplies and equipment have been requisitioned, buildings have been left intact. If the usual "scorched earth" policy is carried out by the Germans however, it becomes likely that many hospitals and hospital buildings now in existence will be demolished. More important and more likely to be destroyed are such important facilities as the Pasteur Institutes of Paris, Brussels, etc.

A summary of hospital facilities for Germany, Norway, Denmark, the Netherlands and France are given in Tables II to VI. In each instance the figures

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are the most recent available, and are not necessarily accurate. According to the 1935 hospital statistics for Germany, there were 5226 hospitals with 705,980 beds, distributed as indicated in Table II. The number of hospitals and beds apparently has been steadily decreasing, so that in 1939 there were only 4861 hospitals with 662,996 beds. Sixty-five percent of the beds available were in public institutions, 28 percent in free charitable hospitals, and 6 percent in private hospitals. Military hospitals and hospitals taken over for military use are not included in these figures. Similar discrepancies probably exist in each of the tables given, but such changes are not significant and do not alter the distributional picture of hospital locations and concentrations as outlined.

In Belgium information is available only as to the total number of hospitals and beds, without regard to location. Figures for 1937 indicate that there were approximately 350 general hospitals with 20,000 beds. Of these, 200 hospitals with 15,000 beds were public institutions, while 150 with 5,000 beds were privately owned. There were 18,000 beds in 60 hospitals for the insane, as well as 26 tuberculosis sanatoria, 56 maternity hospitals, and 550 homes for the aged.

Hospital information for Norway, as outlined in Table VI, does not represent either the total number of hospitals or the total number of beds available. This list has been compiled by members of the Royal Norwegian Forces Medical Corps and indicates the number of hospitals and beds available for use by troops in the event of necessity. Official Government statistics for 1938 indicated that there were 338 hospitals exclusive of 146 institutions for the treatment of tuberculosis. Statistics on these hospitals have been compiled from official sources and are available for study.

TABLE II

Hospitals in Germany, 1935

(Medical Intelligence Division, Preventive Medicine Service,
Office of the Surgeon General, U.S. Army)

I. <u>Preussen</u>	<u>No.</u>	<u>Beds</u>
a. Province of Ostpruessen		
1. Dist. of Konigsberg	75	9,919
2. Dist. of Gumbinnen	21	1,870
3. Dist. of Allenstein	20	3,173
4. Dist. of Westpruessen	18	1,968
Total Ostpruessen	134	16,930
b. Province of Brandenburg		
1. Dist. of Potsdam	178	20,607
2. Dist. of Frankfurt	75	10,427
Total Brandenburg	178	31,034
c. City of Berlin Total	227	47,045
d. Province of Pommern		
1. Dist. of Stettin	99	13,296
2. Dist. of Koslin	51	5,521
Total Pommern	150	18,817

I. <u>Preussen</u>		<u>No.</u>	<u>Beds</u>
e.	Province of Grenzmark Posen-West Preussen		
1.	Dist. of Schneidemuhl Total	20	2,143
f.	Province of Niederschiesien		
1.	Dist. of Breslau	88	21,300
2.	Dist. of Liegnitz	122	12,239
	Total Niederschiesien	210	33,539
g.	Province of Oberschiesien		
1.	Dist. of Oppein Total	90	10,794
h.	Province of Sachsen		
1.	Dist. of Magdeburg	73	11,684
2.	Dist. of Merseburg	70	9,422
3.	Dist. of Ersefurt	68	6,162
	Total Sachsen	211	27,268
i.	Province of Schleswig-Holstein		
1.	Dist. of Schleswig Total	194	18,414
j.	Province of Hannover		
1.	Dist. of Hildeshein	55	6,861
2.	Dist. of Hannover	62	7,872
3.	Dist. of Luneburg	37	5,029
4.	Dist. of Stade	18	4,905
5.	Dist. of Osnabruck	62	4,464
6.	Dist. of Aurich	28	2,247
	Total Hannover	262	31,378
k.	Province of Westfalen		
1.	Dist. of Munster	151	20,010
2.	Dist. of Minden	101	14,324
3.	Dist. of Arnsberg	160	30,166
	Total Westfalen	412	64,500
l.	Province of Hessen-Nassau		
1.	Dist. of Kassel	83	11,067
2.	Dist. of Wiesbaden	122	19,122
	Total Hessen-Nassau	205	30,189
m.	Rheinprovinz		
1.	Dist. of Koblenz	101	11,739
2.	Dist. of Dusseldorf	271	52,263
3.	Dist. of Koln	148	18,283
4.	Dist. of Trier	35	3,526
5.	Dist. of Aachen	47	7,555
	Total Rheinprovinz	602	93,366
n.	Province of Hohenzollernsche-Lande		
1.	Dist. of Sigmariangen Total	8	581
	Total Preussen		2,903 425,998

II. Bayern

1.	Dist. of Oberbayern	237	25,122
2.	Dist. of Niederbayern	134	10,986
3.	Dist. of Pfaiz	59	7,407
4.	Dist. of Oberfranken and Mittelfranken	177	17,701

II. Bayern

	<u>No.</u>	<u>Beds</u>
5. Dist. of Unterfranken	101	8,556
6. Dist. of Schwaben	121	12,261
Total Bayern:		829 82,033

III. Sachsen

1. Dist. of Chemnitz	39	6,082
2. Dist. of Dresden-Bautzen	178	20,396
3. Dist. of Leipzig	57	12,676
4. Dist. of Zwickau	63	6,051
Total Sachsen		337 45,205

IV. Wurttemberg

1. Dist. of Neckarkreis	85	11,017
2. Dist. of Schwarzwaldkreis	60	5,468
3. Dist. of Jagstkreis	49	4,178
4. Dist. of Donaukreis	62	9,320
Total Wurttemberg		256 29,983

V. Baden

1. Dist. of Konstanz	69	9,084
2. Dist. of Freiburg	99	10,567
3. Dist. of Karlsruhe	52	7,553
4. Dist. of Mannheim	65	9,227
Total Baden		285 36,431

VI. Land Thuringen

110 11,503

VII. Volkstaat Hessen

1. Prov. of Starkenburg	45	5,987
2. Prov. of Oberhessen	49	4,839
3. Prov. of Rheinhessen	20	2,852
Total Volkstaat Hessen		113 13,678

VIII. Freie and Hansestadt

1. Dist. of Hamburg	51	19,255
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IX. Freistaat Mecklenburg

99 7,443

X. Land Oldenburg

1. Dist. of Oldenburg	42	4,957
2. Dist. of Lubeck	20	1,551
3. Dist. of Birkenfeld	3	224
Total Land Oldenburg		65 6,732

XI. Freistaat Braunschweig

35 4,169

XII. Freistaat Anhalt

23 3,217

XIII.	<u>Freie und Hansestadt Bremen</u>	26	5,494
XIV.	<u>Land Lippe</u>	18	2,410
XV.	<u>Freie und Hansestadt Lubeck</u>	6	1,995
XVI.	<u>Freistaat Schaumburg Lippe</u>	2	170
XVII.	<u>Saarland</u>	43	6,709
XVIII.	<u>Freistaat Danzig</u>	25	3,541
Germany - Grand Total		5,226	705,980

TABLE III

Hospitals in France, 1933

(Medical Intelligence Division, Preventive Medicine Service,
Office of the Surgeon General, U.S. Army)

		Number of Hospitals	Number of Beds					
			Civil- ians	Sick Military	Infir- mities & Incur- ables	Children	Staff	Total
1.	Aine	35	795	112	557	99	311	1,874
2.	Aisne	35	1,209	146	1,092	330	398	3,175
3.	Allier	25	1,262	258	908	284	428	3,140
4.	Alpes (Basses-) . . .	17	412	16	357	52	124	961
5.	Alpes (Hautes-) . . .	7	299	52	177	32	124	684
6.	Alpes-Maritimes . . .	25	1,932	256	545	72	229	3,034
7.	Ardeche	17	372	32	540	53	205	1,202
8.	Ardennes	12	691	57	743	88	244	1,823
9.	Ariege	12	424	63	359	18	86	950
10.	Aube	15	379	30	415	35	178	1,037
11.	Aude	9	703	101	577	90	179	1,650
12.	Aveyron	12	600	65	545	77	174	1,461
13.	Belfort	1	188	-	-	-	41	229
14.	Bouches-du-Rhone . .	28	2,985	165	1,674	15	435	5,274
15.	Calvados	21	869	909	1,059	236	254	3,327
16.	Cantal	18	286	-	598	25	132	1,044
17.	Charente	12	613	111	493	161	181	1,559
18.	Charente-Inferieure .	9	1,131	111	526	153	417	2,338
19.	Cher	22	426	2	559	85	159	1,231
20.	Correze	14	409	157	327	29	119	1,041
21.	Corse	3	216	-	54	10	65	345
22.	Cote d'Or	26	1,559	296	627	189	464	3,135
23.	Cotes du Nord	13	834	173	994	74	300	2,375
24.	Creuse	13	212	9	413	24	78	736
25.	Dordogne	32	559	118	275	79	136	1,167

Hospitals in France, 1933
(Continued)

Department	Number of hospitals	Number					
		Civil-ians	Sick military	Infirm aged & incur-ables	Children	Staff	Total
26. Doubs	14	765	335	293	76	338	1,807
27. Drome	13	682	151	643	64	207	1,747
28. Eure	21	1,175	123	1,113	97	380	2,888
29. Eure-et-Loire	26	897	162	587	30	315	1,991
30. Finistere	25	1,069	61	1,195	306	551	3,182
31. Gard	24	960	133	949	118	432	2,592
32. Garonne (Haute) . . .	13	910	-	886	56	50	1,902
33. Gers	15	368	60	426	113	181	1,148
34. Gironde	20	2,794	49	1,175	152	952	5,122
35. Herault	30	1,941	347	1,588	191	465	4,532
36. Ille-et-Vilaine . . .	26	1,525	52	1,998	209	478	4,262
37. Indre	16	553	73	365	83	195	1,269
38. Indre-et-Loire . . .	16	1,573	238	805	108	343	3,067
39. Isere	32	2,103	110	697	41	725	3,736
40. Jura	16	610	45	233	12	206	1,106
41. Landes	14	398	54	337	38	121	948
42. Loir-et-Cher	13	626	59	739	167	247	1,838
43. Loire	41	2,392	104	1,663	245	787	5,191
44. Loire (Haute)	23	410	7	797	58	216	1,488
45. Loire-Inferieure . . .	21	1,729	14	1,530	147	714	4,134
46. Loiret	25	1,079	168	1,181	206	527	3,161
47. Lot	2	162	36	159	12	60	429
48. Lot-et-Garonne . . .	21	371	17	397	14	161	960
49. Lozere	10	106	26	200	9	73	414
50. Maine-et-Loire	48	1,225	228	1,735	260	698	4,146
51. Manche	30	1,079	76	1,224	477	346	3,202
52. Marne	20	824	802	1,663	649	625	4,623
53. Marne (Haute)	14	513	155	536	16	204	1,424
54. Mayenne	29	736	39	1,011	208	282	2,276
55. Meurthe-et-Moselle . .	27	2,147	144	2,062	542	1,153	6,048
56. Meuse	15	549	467	678	160	274	2,128
57. Morbihan	15	980	117	1,136	117	445	2,795
58. Moselle	35	2,001	77	1,145	175	745	4,143
59. Nièvre	14	598	94	496	145	207	1,540
60. Nord	104	4,746	154	8,625	828	1,925	16,278
61. Oise	30	929	241	1,319	226	378	3,093
62. Orne	17	934	90	820	110	297	2,251
63. Pas-de-Calais	24	1,798	100	2,517	244	524	5,183
64. Puy-de-Dome	30	1,191	251	1,502	255	227	3,426
65. Pyrenees (Basses) . . .	13	698	146	429	13	274	1,551
66. Pyrenees (Hautes) . . .	6	381	142	268	52	96	939
67. Pyrenees-Orientales . .	13	532	92	304	192	76	1,196
68. Rhin (Bas-)	37	3,380	198	1,300	190	1,497	6,565
69. Rhin (Haut-)	54	2,829	32	2,419	318	1,079	6,677
70. Rhone	30	6,076	20	2,939	302	1,397	10,734
71. Saone (Haute)	6	328	79	142	22	139	710
72. Saone-et-Loire	34	979	264	739	184	363	2,529
73. Sarthe	37	783	171	1,017	70	468	2,509
74. Savoie	12	773	91	664	10	190	1,728
75. Savoie (Haute)	14	838	86	270	39	224	1,457
(Paris	69	26,278	-	12,612	1,965	1,669	42,524

Hospitals in France, 1933
(Continued)

Department	Number of hospitals	Number					Staff	Total
		Civil-ians	Sick-military	Infirm-aged & incur-ables	Children			
76. Seine (Banlieue). . . .	19	-	48	2,410	-	109	2,567	
77. Seine-Inferieure. . . .	44	3,786	359	3,263	289	1,514	9,211	
78. Seine-et-Marne. . . .	25	1,156	244	1,144	77	479	3,100	
79. Seine-et-Oise.	40	3,715	102	1,809	98	1,065	6,789	
80. Sevres (Deux-).	17	845	107	640	48	288	1,928	
81. Somme.	31	1,155	108	1,723	238	642	3,866	
82. Tarn.	7	430	105	532	146	132	1,345	
83. Tarn-et-Garonne. . . .	13	422	132	353	43	170	1,120	
84. Var.	29	879	140	744	158	302	2,223	
85. Vaucluse.	59	1,317	118	1,083	49	442	3,009	
86. Vendee.	20	744	136	734	90	323	2,027	
87. Vienne.	11	700	388	583	133	203	2,007	
88. Vienne (Haute-). . . .	9	695	182	785	42	263	1,967	
89. Vosges.	29	1,213	187	1,516	110	456	3,482	
90. Yonne.	22	748	136	489	12	208	1,593	
Totals: (90 de- partments)	2,062	126,553	12,511	101,741	14,164	36,643	291,612	

TABLE IV

Hospitals in the Netherlands

(Ministerie van Sociaal Zaken, Netherlands Government)

Province	No. of places which have in- stallations	Hospitals of all Types		General Hospitals		Tuberculosis Sanatoria		Mental Hospitals		Sanatoria & Rest Homes	
		No.	Beds	No.	Beds	No.	Beds	No.	Beds	No.	Beds
Drenthe	10	14	2041	5	391	1	80	4	1430	4	140
Friesland	9	16	1381	8	923	1	-	2	560	5	398
Gelderland	51	123	8053	40	2787	21	1347	10	1801	52	2118
Groningen	3	14	2096	7	1470	-	-	7	626	-	-
Limburg	16	30	4803	15	2333	5	670	7	1530	3	220
Noordbrabant	40	60	6773	37	3095	3	22	12	2767	8	889
Noordholland	33	98	13823	43	7440	10	916	11	4195	29	1272
Overijssel	16	25	2677	19	1805	1	226	2	646	3	-
Utrecht	18	52	5487	16	2578	6	689	7	1918	23	302
Zeeland	10	13	663	11	663	-	-	-	-	2	-
Zuidholland	28	93	13694	57	8118	7	462	15	4778	14	336
Total	234	538	61991	263	31603	55	4412	77	20301	143	5675

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TABLE V

Hospitals in Denmark, 1939

(Medicinalberetning for Kongeriget Danmark, 1939,
København, 1941)

	<u>Hospitals</u>	<u>Beds</u>	<u>Doctors</u>	<u>Trained Nurses</u>	<u>Student Nurses</u>
København.	15	6,176	422	1,759	1,020
Københavns	6	1,692	88	306	359
Frederiksberg.	2	1,253	57	308	196
Frederiksborg.	6	562	20	76	101
Holbæk.	6	546	19	54	70
Soro	7	679	22	69	120
Præsto.	7	544	26	82	101
Bornholms.	6	278	11	26	51
Lolland-Folster.	7	545	18	58	64
Svendborg.	7	719	27	94	134
Odense	7	1,161	47	152	202
Vejle.	9	1,305	36	122	176
Skanderborg.	6	621	21	69	106
Aarhus	7	1,440	57	254	243
Randers.	8	862	23	84	99
Aalborg.	8	1,024	35	136	132
Hjørring	9	814	29	90	125
Thisted.	6	391	15	38	65
Viborg	3	656	31	103	168
Ringkøben.	7	814	29	62	113
Ribe	6	757	25	89	123
Haderslev.	3	340	10	41	52
Aabenraa	3	205	8	26	19
Sønderborg	2	309	18	59	58
Tønder	2	123	4	16	21
Totals:	155	24,056	922	3,127	2,887

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TABLE VI

NORWAY

Hospitals Suitable for use by Military Forces

(Royal Norwegian Forces Medical Corps)

<u>Districts</u>	<u>Class A & B</u>		<u>Class C</u>		<u>Total</u>	
	<u>No.</u>	<u>Beds</u>	<u>No.</u>	<u>Beds</u>	<u>No.</u>	<u>Beds</u>
<u>A. Southern Norway</u>						
1. Namsos	4	160	1	-	5	160
2. Trondheim	17	1,387	2	50	19	1,437
3. More and Romsdal	8	650	4	90	12	740
4. Sogn og Fjordane	6	300	1	25	7	325
5. Bergen	9	1,045	3	50	12	1,095
6. Voss and Inner Hardanger	3	150	-	-	3	150
7. Haugesund	7	260	-	-	7	260
8. Stavanger-Egersund	7	575	2	260	9	835
9. Lista	3	90	-	-	3	90
10. Kristiansand	6	550	-	-	6	550
11. Aust-Agder	6	275	1	90	7	365
12. Skien	7	570	-	-	7	570
13. Drammens	4	370	2	220	6	590
14. West of Oslofjord	7	670	-	-	7	670
15. East of Oslofjord	10	565	-	-	10	565
16. Oslo	14	3,850	1	500	15	4,350
17. Mjosa	13	1,355	4	300	17	1,655
18. Gudbrandsdalen	3	80	6	250	9	330
19. Glommensdalen	9	380	4	205	13	585
20. Valdres	2	100	2	150	4	250
Totals	145	13,382	33	2,190	178	15,572
<u>Southern Norway</u>						

<u>B. Northern Norway</u>	<u>36</u>	<u>2,455</u>
<u>Grand Total - Norway</u>	<u>214</u>	<u>18,027</u>

Note

Class A. includes hospitals with complete equipment.

Class B. includes hospitals, nursing homes, and tuberculosis sanatoria with insufficient surgical and X-ray equipment.

Class C. includes suitable buildings which are not normally used as hospitals.

The number of beds given refers to the net number available for Military use, excluding those reserved for civilian use.

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b. Drugs, Equipment and Supplies

Although the import of such materials into German-occupied Europe has practically ceased, drug supplies have not decreased to critical levels except in a very few instance. Germany has always been a leading manufacturer and exporter of drugs and medicinal supplies, and only the lack of raw material can produce shortages of any consequence. The two drugs most notable for their scarcity are insulin and liver extract. Pancreas and liver, from which these extracts are made, must be imported from abroad in amounts sufficient to produce the European requirements of these remedies. Lacking such raw materials, these two biologicals have been severely rationed. Available iodine supplies are now used for war work and essential photography, leaving little for medicinal use. However, the large number of substitute chemical antiseptics available make this of little consequence. Glycerine supplies have been diverted to the manufacture of explosives and other war materials. Chlorine supplies are sufficiently low to have necessitated curtailing their use for the purification of water. Arsenic compounds have been used in the manufacture of war gases, but there is no evidence of quantities insufficient to meet ordinary demands, especially in antiluetic therapy. Bismuth stocks are dwindling, especially in France, the Netherlands, and Norway, because the greater portion of the world's output comes from North and South America. Opium and opium derivatives (morphine, codeine) have been sharply restricted in Germany, and are scarce in the occupied areas. Lack of quinine supplies and imports is counterbalanced by adequate supplies of synthetic anti-malarials such as atabrine and plasmochin. Judging from the outbreaks of malaria which have occurred in Central Europe and the Balkan countries, supply or distribution of these drugs is not adequate outside of Germany proper.

Increasing attention has been paid to the growing of medicinal herbs, such as digitalis, in order that supplies will be adequate. The pharmaceutical industry in Germany has maintained its plants, and has now assumed control of pharmaceutical houses throughout much of occupied Europe. A list of the principal manufacturers of drugs and biologicals in this area has been compiled recently, and is available for reference.

The Pasteur Institutes in France, Holland and Belgium and equivalent institutions in Denmark, Norway and Germany are still functioning and can supply adequate amounts of most of the necessary sera, vaccines and special biologicals. Difficulty has been experienced only in the manufacture of typhus vaccine. Many methods have been tried, but the use of mouse or rabbit lung vaccine has proved most practicable, principally because of the shortage of the essential ingredients necessary in the Cox yolk-sac method, which is accepted as the standard in the United States. Quantities of typhus vaccine are insufficient, even for routine immunization of the Army. Only those individuals considered to be in greatest danger of exposure and infection (doctors, nurses, and other medical personnel and personnel of delousing units) are permitted to receive routine anti-typhus inoculations. Of 25 PW's examined, only 3 were found to have typhus inoculations recorded in their immunization registers. The Pasteur Institute in Brussels is said to have recently undertaken the task of manufacturing typhus vaccine, something never before attempted by them.

Such surgical supplies as cotton, gauze, bandages and surgical linens are scarce and, even in the field, dressings must be boiled and used repeatedly. Supplies available to civilian physicians in the occupied countries usually come from hoarded pre-war stocks. Surgical instruments of superior quality formerly were among Germany's best products. Since the war, the quality of these instruments has steadily declined; in some instances, high grade steel has been replaced with aluminum or plastics, and only cutting edges retain their former composition. These instruments are greatly inferior, and can withstand very little use. The manufacture of x-ray equipment in Germany and France has been curtailed during the war. The present grade of roentgen tube is definitely inferior, and has a very short life. Replacements and repairs are of poor quality. Electrical

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equipment has shown the same deterioration, especially the more intricate types. Small electric lights for use in cystoscopes, bronchoscopes, etc., are inferior in quality, and are very difficult to obtain outside of Germany proper.

While the situation in Western Europe regarding medical supplies is not good, there does not appear to be any likelihood of the development of critical shortages capable of greatly hampering the war effort. Deficiencies most keenly felt by the average individual are vitamin preparations, laxatives, and barbiturates. The use of sedative and hypnotic drugs has greatly increased in German Europe, and prescriptions now are needed to buy such medicaments. A doctor's authorization is required for a large number of the drugs ordinarily dispensed by pharmacists, and because of the limited supplies, the druggist is allowed some discretion in furnishing a product slightly different from that called for in a given prescription.

2. Medical Personnel

Medical personnel in pre-war Western Europe is shown in Table VII. Present day German territory, including Austria, Sudetenland, and other incorporated territories is said to have available 78,447 physicians. This includes not only those who are no longer able to practice due to age or infirmity, but also those in the Army. Regardless of the estimates of the number of physicians in the German Army (30,000 - 40,000), it is obvious that there are fewer civilian physicians available to care for a large group of individuals among which there is more sickness than in 1939. This is indicative of the gigantic task facing physicians throughout Western Europe. While some of the countries have tried to maintain normal standards of education and training to insure adequate medical care, Germany has been very gradually reducing her medical requirements and professional standards. The university course has been cut in half, and a year of hospital training is no longer required, this being incorporated into the school curriculum. Recent graduates are poorly trained and entirely inadequate for the tasks to which they are assigned. Germany has been forced to release interned "non-Aryan" physicians in order to practice in order to care for the tremendous amount of sickness. Lack of medical personnel, and shortage of manpower have led Dr. Goebbels, the Reich Minister of Health, to use almost every established tenet of public health and preventive medicine in order to furnish sufficient laborers for German factories. German physicians are entirely regimented as are most other professional personnel, and must wear distinctive insignia on their clothing. "Heilpraktikers", (Health healers), totally untrained medically, have been allowed practically equal rights with physicians, in order to overcome the tremendous shortages. Regardless of the methods used to combat the lack of physicians, it is apparent that in greater Germany there is a steady decline in the quantity and quality of medical care furnished.

In the occupied countries of Western Europe the conscription of physicians by the Germans to serve in the factories and camps in Greater Germany has created a grave medical situation. In spite of this, it seems probable that the standards of medical care have been maintained adequately in the majority of these countries. The physicians have been active participants in many of the campaigns directed against tuberculosis in the occupying German forces. Medical schools are still functioning, and there has been no appreciable change in the medical curriculum. Many of these physicians will play an active part in future military operations within their own countries.

In general, the same statements apply to other medical personnel, both in Germany and the occupied territories of Western Europe. Professional standards for dentists, nurses, veterinarians, pharmacists, etc., are higher outside of Germany at the present time, in spite of that country's former enviable position. Of the approximate figures furnished in Table VII, the only notable deficiency is in the number of nurses stated to be registered in France prior to the outbreak of war.

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Medical Personnel in the - or - countries

Country	Physicians	Dentists	Nurses	Pharmacists	Administrators	Engineers	Other
U.S.S.R. 1937	3,776	1,167	?	2,474	711	2,976	-
Poland 1939	3,252	1,009	417- Crd: 3915- Junc:	323	?	197	1,930 practicing dentists
France 1937	27,427	10,000 (ex. post)	3-10,000	?	?	12,000	-
Germany 1934	43,897	14,353	120,000	1,000	?	25,700	12,107 oilpracti- cers
Netherlands 1933	3,274	1,272	211 Crd: 447- Junc: 7400 Crd: 150- Junc:	3,057	?	1,026	-
Norway 1939	2,361	1,600	5,500	7	100	1,400	-

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3. Medical Institutions and Laboratories

a. Medical Institutions

As mentioned above, medical education in Germany has deteriorated greatly since the onset of war. The number of medical schools in Germany is not known, but in a bulletin of the League of Nations published in 1932 it is stated that all of the principal universities of Germany have medical faculties. Such cities as Berlin, Cologne, Dresden, Stuttgart, Salzburg, Dusseldorf and Hamburg all have one or more medical schools. The lack of suitable instructors caused by the purging of "non-Aryan" personnel has decreased the effectiveness of these schools, and contributed to the deterioration of German medical standards.

In the other countries of Western Europe medical education has fared considerably better. The majority of France's 24 medical schools are thought to be in operation, though with somewhat limited resources. In Belgium only the medical school at the University of Brussels has been closed. Medical schools at Liege and Louvain, as well as the Flemish institution at Ghent, have maintained their regular activity. The veterinary school in connection with the University at Brussels may have been closed also, but it is presumed that its facilities for the preparation of smallpox vaccine have been preserved. In the Netherlands there are also 4 medical schools, the Universities of Utrecht, Groningen, Leiden and Amsterdam each having a medical faculty. There are, in addition, a dental school and a veterinary school at Utrecht. The number of medical schools in Denmark is not stated, but observers report that there has been little change in their activities as compared with pre-war conditions. Norway maintains a single medical school at Oslo. It is reported that a number of the faculty have been forcibly transferred to Germany.

b. Laboratories

All state laboratories in Germany are under the control of the Reich Minister of Health. The number and location of these in present day Germany is not known. The principal laboratory functioning in France at the present time is the Pasteur Institute in Paris. State and municipal laboratories are also in existence. In Belgium there is a Central State Laboratory in Brussels which is primarily for the control of laboratory procedures and biologicals which are made in Belgium. This laboratory is affiliated with the Pasteur Institute in Brussels. The latter is equipped to make sera and vaccines of all types. In each of the provinces there is a Provincial Institute of Hygiene and Bacteriology which is used largely for diagnostic purposes, these facilities being available to all physicians. The Netherlands Government also maintains a central public health laboratory with bacteriological, serological, chemical pharmacological and veterinary divisions. This central laboratory is located in Utrecht, and works in combination with the Pasteur Institute in the manufacture of vaccines and sera. There were numerous municipal and regional diagnostic laboratories which were under the general supervision of the Central State Public Health Institute and which still may be operating. The State Veterinary Service had a central laboratory and serum plant in Rotterdam, the present functional state of which is unknown.

The State Serum Institute in Copenhagen is the only Government laboratory in Denmark equipped for the manufacture of vaccines and biologicals. Diagnostic laboratories are maintained in most of the larger hospitals.

Norway lists the following Government controlled laboratories:

- (1) The Bacteriological Institute of Oslo.
- (2) State Institute of Public Health, Oslo.
- (3) The Bacteriological Laboratories of the Oslo Board of Health.

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- (4) The Bacteriological Laboratory of the Veterinary Institute, Oslo
- (5) The Naval Laboratory, Horten
- (6) Laboratories of the Trondheim Municipal Hospital, Trondheim
- (7) H. G. Gade Institute, Bergen
- (8) State Institute for Bacteriology and Serology, Tromsø.

4. Social Services

Information concerning social service and relief activities in Germany at the present time is scarce. The German Red Cross is active and is known to be working through the International Red Cross in the distribution of food packages to allied prisoners-of-war. Red Cross activities in connection with German military personnel and civilians are not known. The German Reich is responsible for most of the relief which is furnished to the civilian population through Government financed social insurance schemes. These are reported to include sickness and maternity benefits and paid vacations for workers.

In France the Red Cross remains active though its work is hampered by lack of funds. Before the war considerable social aid was administered through departmental and local public health officials. The Belgian Red Cross is functioning and maintains its affiliation with the international organization. There was also an organization known as Succor d'Hiver, (Winter Help), which is a German inspired charitable group administered by collaborationists. Forced contributions are accepted and the funds are used for purchasing drugs, clothing, and other essentials for the poor.

The Netherlands Red Cross is especially active in campaigns against tuberculosis and malaria, and also has been instrumental in organizing a national blood transfusion service. Two hospitals are maintained on funds supplied by the Red Cross. There are two additional national organizations in Holland known as the White Cross and the Green Cross. These have combined to provide financial assistance and nursing care for those individuals that cannot be cared for in hospitals. This combined group also operates maternal and child welfare centers, furnishes temporary domestic help for sick individuals, and maintains an ambulance service for the transportation of the sick.

There is a functioning Red Cross group in Denmark, but no information is available concerning its activities. It is stated that this organization has no connection with the International Red Cross.

The Norwegian Red Cross has 220 local groups and approximately 80,000 contributing members. Its principal activities are the operation of several hospitals and nursing schools. Working in close cooperation with the Red Cross is the Norwegian Women's Voluntary Health Organization. There is also a National Tuberculosis Association numbering 150,000 members which operates sanatoria and nursing schools and directs an active anti-tuberculosis educational campaign. For the benefit of the working classes there is the Norwegian Relief which has a large program directed towards the improvement of home and industrial hygiene.

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III. Disease Information (See Tables VIII and IX, and Appendix)

In studying medical conditions on the continent of Europe it is apparent that many of the diseases affecting civilian inhabitants may become military medical problems as well. Any attempt to differentiate between these two groups is necessarily artificial and there must be considerable overlapping. An arbitrary classification has been devised for the purpose of accentuating the principal problems in each group, as well as of indicating their relative importance within the group. Where a disease is significant to both military forces and the civilian population it is fully discussed from both viewpoints, but under the military classification. In the civilian classification the disease merely is listed in the order of its importance in that group.

1. Diseases of Special Military Importance

a. Enteric Infections

The enteric group of infections (typhoid fever, paratyphoid fevers, dysentery, gastro-enteritis, and common diarrheas) are endemic throughout Europe, and during the war years they have increased considerably. Circumstances favoring the spread of these diseases include failure of normal water supplies, shortages of food, disruption of sewage disposal facilities, lack of pasteurization of such dairy products as are available, the use of night soil for fertilizer, lack of control of carriers, and the general deterioration of health in many localities. These diseases are spread primarily by contaminated food or water, though house flies may materially aid in their transmission.

(1) Typhoid fever (See Table X)

Germany reported 16,291 cases of this disease in 1942, over 5 times as many as were reported in 1936. Measured in numbers of cases per 100,000 population to allow for the increased size of Greater Germany, the rise was from 4.4 per 100,000 to 18.0 per 100,000. A minority of these occurred in the old Reich, the rest appearing in the peripheral area to the east and south. Typhoid fever has been widespread in the Government General of Poland, but it is claimed that the epidemic has not reached into Germany proper. German health authorities report that the problem has been effectively dealt with by a program of compulsory inoculation. In France the total number of cases is not known, but many small localized outbreaks are recorded, and the disease was reported to be epidemic in the Mediterranean region of Southern France in 1942. Belgium reported only 425 cases in 1942, which was slightly more than in 1941. The reported incidence is probably less than the actual numbers of cases. The incidence of typhoid fever in the Netherlands has risen sharply during the past two years. The yearly average from 1939 to 1941 was 147 cases. In 1942 there were 551 cases, and 459 cases during the first 10 months of 1943. There has been no increase in typhoid fever in Norway and Denmark, each country reporting less than 100 cases per year.

(2) Paratyphoid fevers

The incidence of the paratyphoid group of fevers in Germany was 6,376 in 1942, as compared to 3,136 in 1936. In the other countries of Western Europe, the incidence of paratyphoid bears the same relationship to typhoid fever as it does in Germany. Norway experienced a rather severe but localized outbreak of paratyphoid-A infection during December 1943, 200 cases appearing in a group of Allied prisoners-of-war in the vicinity of Kirkenes. This is the first appearance of a paratyphoid-A infection in Norway in recent years.

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TABLE VIII

Diseases in the Netherlands

(Ministerie van Sociale Zaken, Netherlands Government)

	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>
				(1 Jan-31 Oct)	
Diphtheria	1273	1730	5435	19407	39055
Scarlet fever	10257	8841	7198	12694	21701
Typhoid fever	172	108	161	521	459
Paratyphoid fever	160/136	101/165	87/186	252/184	292
Bacillary Dysentery	703	1185	3414	4132	4871
Amebic Dysentery	9	8	10	8	-
Meningitis	150	277	433	177	131
Poliomyelitis	403	111	115	196	1634
Encephalitis	26	19	35	22	32
Weil's disease	73	62	68	57	-
Undulant fever	29	24	18	41	-
Malaria	-	-	677	743	808

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TABLE IX

Diseases in Norway

(M.A. London 59624, 7 August 1943)

<u>Disease</u>	<u>1938</u>	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>
Measles.	21,263	6,442	3,034	21,430	21,749
Scarlet fever. . . .	3,691	5,082	3,825	6,131	13,908
Mumps.	2,265	4,350	6,637	7,841	14,673
Whooping cough . . .	9,190	9,208	13,315	20,365	15,849
Polioomyelitis. . . .	105	55	56	1,726	279
Meningitis	21	29	88	490	272
Encephalitis	26	9	26	62	17
Typhoid fever. . . .	34	50	72	73	58
Paratyphoid fever. .	34	46	59	53	25
Dysentery.	25	32	65	285	1,227
Acute enteritis. . . .	23,672	24,335	29,290	76,513	72,313
Undulant fever . . .	7	5	1	0	3
Diphtheria	187	72	138	2,609	8,349
Weill's disease . . .	-	6	29	112	46
Epidemic Hepatitis .	-	-	-	9,313	26,835
Influenza.	34,810	93,783	38,526	69,025	31,661
Tuberculosis Pulm. .	4,283	3,986	2,925	3,310	3,481
Malaria.	70	40	17	7	7
Scabies.	9,605	11,048	15,371	24,477	37,441
Syphilis	375	317	293	465	1,108
Gonorrhea.	6,005	5,616	4,158	4,943	5,187
Soft Chancre	67	77	76	46	51
Lymphogranuloma. . .	0	13	18	6	4
Pneumonia, Lobar . .	4,949	5,806	6,280	8,500	13,026
Bronchopneumonia . .	8,702	8,542	7,682	9,722	10,839
Laryngitis and Bronchitis	107,774	107,925	104,276	114,098	132,091

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TABLES OF EPIDEMIOLOGICAL DATA REPORTED IN CERTAIN COUNTRIES FROM 1909-1919

(Continuation of the description of the League of Nations Weekly Epidemiological Bulletin, 23 July 1919)

	1909	1910	1911	1912	1913
Germany	2,679	3,036	2,655	4,885	1,767
Grossreich		2,857	2,325	16,403	5,339 4 1/2 mos.
England and Wales	1,529		349	487	103 4 "
Belgium	285	-	1,496	671	321 6 "
Bulgaria	2,418	1,464	60	1,233	14 2 mos.
Denmark	20	21	839	44	19 5 mos.
Scotland	148	388	284	144	41 2 "
Eire	386	253	33,928	415	124 4 "
Spain	4,414 (6 weeks)	27,557	666	51,321	720 2 mos.
Estonia	367	101 (3 months)		757 (7 months)	
Finland	146	380			
France	4,373	419 (2 months)			
Greece	5,001	2,395 (8 months)			
Hungary	6,873	5,387	7,648	12,322	2,133 4 1/2 mos.
Italy	25,143	25,300	43,011	45,306 (10 months)	
Norway	61	72	70	77	27 1 "
Netherlands	172	100	157	23	40 2 "
Rumania	1,017	2,432	3,393	332 (6 months)	
Siam	51		112	119	9 1 "
Sweden	5,211	5,661	5,119	5,012	1,633 1 "
Yugoslavia	4,229	4,211	517 (2 months, 1 week)		

(3) Dysentery, Diarrhea, and Gastro-enteritis

It is frequently difficult to distinguish between these diseases, especially in wartime, when diagnostic facilities are curtailed or lacking. As a group however they are endemic throughout all of Western Europe, and there have been significant sharp outbreaks. Particularly is this true of dysentery, which in some areas has equalled or surpassed the incidence of typhoid fever. In 1942, in Germany, there were 15,148 cases, in the Netherlands 4,132, and Norway 1,227. Norway had only 285 cases in 1941. During the summer of 1943 a rather severe epidemic occurred in the Netherlands, when between 300 and 600 cases appeared weekly during September. Up to 1 November 1943, 4,871 cases had been recorded. No figures are available for Belgium, Denmark or France, but it is probable that similar increases have occurred in these countries also.

Dysentery of the Flexner type is most common, though the Shiga and Sonne varieties are seen. In Norway the Sonne type is most frequently diagnosed. The common diarrheas and ailments diagnosed as acute gastro-enteritis are almost universal. These may be infectious in origin, but often are ascribed to the faulty, deficient diet. Amebic dysentery is encountered infrequently, and is not considered of importance to military forces, although a seeding of the disease may have been established by German soldiers returning from North Africa.

Because of the prevalence of the enteric infections, it is imperative that troops pay special attention to the procurement of safe drinking water supplies, the sanitary disposal of wastes and garbage, the proper preparation and serving of food and the control of insect carriers (domestic flies).

b. Typhus Fever (See Table XI)

(1) Epidemic typhus fever

Epidemic louse-borne typhus fever in Europe always develops its greatest potentialities under the conditions of war and/or famine. Based on partial figures for 1942 and 1943, the incidence of the disease is increasing throughout the Continent. With the exception of Poland, however, no country seems to have developed any large scale outbreak comparable to the epidemics of the first World War and the years immediately following. All the factors necessary for the propagation and spread of louse-borne typhus fever are present. The principal causes for the increased lousiness of the population are lack of soap, fuel, and hot water, lack of sufficient clothing and linen, and marked overcrowding under unhygienic conditions. In addition, the qualitative and quantitative deficiency of the average diet probably has led to lowered resistance to disease.

The primary European foci of epidemic typhus fever are Poland, Southwestern Russia and the Balkan States. Poland (Government General) had a severe outbreak during 1942, approximately 90,000 cases being recorded according to official German reports, as compared to 22,000 cases in 1941. A large number of these cases were in the Warsaw district. Up to August 28, 1943, 21,000 cases had been reported. Typhus fever has already spread into Germany, and the Reich is now taking drastic measures to check the disease. One hundred hospitals have been set up in Poland, and numerous delousing centers have been established, 254 in Warsaw alone. Decontamination squads are operating, and every attempt is being made to reach as much of the population as possible. Louse infestation also has increased on the eastern front, and though no figures are given, the incidence of typhus fever is also rising. Reports indicate that the German soldier could only reach proper delousing facilities after his unit was withdrawn from the front, and that he was fortunate to receive a delousing treatment once in 6 months. The louse-repellent powder issued to German troops was considered ineffective, and had an offensive odor. In Germany proper, only 2,742 cases of typhus were reported in 1942; figures for the first half of 1943 were about in the same proportion. Civilian cases in Germany have been more-or-less general in distribution, though it is reported that industrial areas are more often involved. Most of the stricken individuals are said to be foreign workers rather than Germans. Further evidence of the rising importance of typhus fever in eastern and central Europe is to be found in the expansion of all available facilities for the production of typhus vaccine. In-

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Typhus fever in Europe from 1883 to 1923

(with Section of the Secretariat of the League of Nations and Epidemiological Record 15 July 1923)

	1918	1919	1920	1921	1922	1923
Country						
England and Wales	0	0	510	2,551	2,742	- 6 months
Bulgaria	0	1	0	0	1	0 4 "
Scotland	91	129	127	302	321	254 4 "
Spain	0	0	7	0	0	0 4 "
Finland	2	63	3	7,690	4,061	377 5 "
France	0	0	0	0	0	- 6 "
Greece	1	0	3x	3x	280	2 4 "
Hungary	60	102	70	-	-	- 6 "
Italy	5	57	93	621	890	645 6 "
Poland	0	1	1	1	-	- 3 "
Netherlands	3,563	3,140	-	-	-	- 6 "
General Government	41	40	486	1,241	-	- 6 "
U.S.S.R.	700x	-	7,900x	-	-	- 6 "
Russia	2,579	-	1,376	1,906	4,001x	6,371 5 "
Czechoslovakia	2,254	1,014	94	215	341x	721 "
Turkey	29	-	813	950	878	1,619 4 "
Yugoslavia	460	453	424	-	-	- 6 "
	636	611				

x = incomplete data

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stitutes were established in Berlin, Riga and Cracow, as well as two ill-fated ones at Kherson and Kiev. Antityphus vaccine is also being prepared by the Warsaw State Institute, and the Typhus Institute of the Bering Works at Lwow. Vaccine is available only for those individuals who are most apt to come in contact with the disease, i.e. doctors, nurses, medical department personnel, and personnel in delousing centers. It is not available for general use among civilians. Vaccines prepared by the Weigl technique, or the rabbit lung method have been used most extensively, and the Cox yolk-sac method to some extent recently. German health authorities constantly stress the need for the highest degree of attention to all phases of the typhus problem, to prevent its further spread within the Reich.

Typhus fever has appeared in scattered locations throughout France, usually in prison or internment camps, or among repatriated workers or soldiers. These apparently have been dealt with promptly, and no outbreaks among civilians have been reported. Health authorities, both German and French, have been active in stamping out such localized manifestations. Belgian sources state that there have been no reported cases of typhus since the 1941 epidemic in Cologne on the Belgian-German frontier. However, it is likely that scattered cases also are occurring in this country since louse infestation is very common. The Pasteur Institute in Brussels is said to have attempted the manufacture of typhus vaccine, presumably for use in Belgium. Cases of typhus are reported each week from the Netherlands, occurring in prison camps and among repatriated individuals. There have been no outbreaks. Denmark has remained free of typhus according to reports up to 1942. Since that time accurate information is lacking, but it is possible that a few cases have occurred here also. Typhus appears irregularly in Norway, eight separate outbreaks being reported between 1920 and 1929. There were no further cases until two outbreaks appeared in 1942, one at Narvik and one at Bodø. During 1943 five outbreaks were recorded, at Kirkenes, Surnadal, Flekkefjord, Søgne and Stavern, but the total number of cases is not known. These were usually among internees and prisoners-of-war, though it is said that a few civilian cases occurred at Stavern and Søgne. Cooperation has been secured between the Norwegian health authorities and the Wehrmacht, and an active antityphus program is believed to have been agreed upon, calling for the establishment of several hundred delousing centers. Many of these are to be located in the region of Oslo, which, because of its crowded population, would be the most dangerous place for an outbreak to appear. Norwegian authorities are specially concerned about the outbreak in Kirkenes. If military operations should occur in this area, there would be the greatest difficulty in preventing the spread of the disease by retreating Germans and dispersed prisoners-of-war. There are few roads for travel, and many exits by sea which would allow almost unrestricted movement of infected individuals into uninfected areas. In the other localities, local control measures can be more easily applied.

Typhus fever at present is a controlled threat to the health of Europe. Under the continued exigencies of war, with mass movement of troops and civilians, and breakdown of normal safeguards, the disease represents a serious hazard to all military forces operating on the continent. Immunity may be developed artificially by vaccination, but it should not be assumed that absolute protection is thus produced. Full attention should be directed to all methods of louse control as described in AR 40-205, 40-210, 615-250, and SGO circular letter No. 33, dated 2 February 1943.

(2) Endemic Typhus Fever

Endemic typhus fever is a milder form of typhus transmitted through the bite of infected fleas. It is limited to a few areas in Northeastern and Southern France, and Northwestern Germany. The disease may be transmitted by the body louse, and may thus occur in a lousy population, though it is not ordinarily associated with lousiness. Endemic typhus fever occurs chiefly in the late summer and fall in persons having contact with rats, or living or working on premises harboring rats. It is much less likely to be of importance to military forces, especially where the rat population can be controlled.

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(3) Tick Typhus (Fievre Boutonneuse)

This type of typhus fever, also mild, is carried by the common dog tick, and is most prevalent in the coastal areas of the countries adjacent to the Mediterranean. In Western Europe, only France reports cases of tick typhus, these appearing in the Southern coastal region. This disease is not considered to be of particular importance to troops.

c. Infectious Hepatitis (Infectious or Epidemic Jaundice)

One of the major medical problems of the present war has been the development of acute infective hepatitis. The term hepatitis is preferred, since jaundice may not always occur. The disease has an apparently world wide distribution, and is very prevalent in Europe. Although exact figures are not available, numerous reports indicate that infectious hepatitis is present throughout Germany, both in the civilian population and on the Eastern front. Among civilians its incidence is said to be third only to scarlet fever and diphtheria. It is reported to have been introduced into Germany from the Eastern front. However, the disease is present in all of the occupied countries. Infectious hepatitis was a notifiable disease only in Norway and Denmark. In Norway 9,313 cases were reported in 1941, the number increasing to 26,835 in 1942. The last available figure for Denmark was 3,079 cases in 1940. Infectious hepatitis is sufficiently serious to be a military hazard, since the disease attacks large groups readily, fatalities are not uncommon, and convalescence is prolonged.

d. Venereal Diseases

Accurate figures on the incidence of venereal disease in Western Europe are not available, especially since many cases are not reported. Such information as can be obtained indicates that conditions are much better in Germany than in any of the occupied countries. But venereal disease continues to be an accentuated problem in wartime because of increased promiscuity and difficulty in applying proper control methods. According to the meager figures available, the proportionate increase in syphilis has been much greater than for gonorrhea. This may be explained in part by the large soldier population, who may be infected but not reported in official statistics, and by the efficacy of the sulfonamide drugs in gonorrhea. However, if all cases could be totaled, it is very likely that gonorrhea also would show a marked increase. Germany has used every method possible to prevent spread of venereal disease, especially in the case of the Wehrmacht. The introduction of licensed brothels, and stringent rules governing prostitution and the treatment of venereal disease may have resulted in some improvement in Germany proper. In all other countries the rates have continued to rise. Venereal diseases in France are reported to have trebled in the last three years. In Norway reported figures show that syphilis has trebled in 5 years, while gonorrhea has declined slightly. It becomes obvious that the increase in gonorrhea is masked, and that both this disease and syphilis are increasing steadily.

Chancroid is fairly common, but lymphogranuloma is seen infrequently

e. Respiratory Diseases

(1) Upper Respiratory Infections

These are common at all times though their periods of maximum incidence are seasonal. Regardless of the appearance of such infections in the civilian population, these diseases will always rank as important causes of non-effectiveness among military forces.

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(2) Influenza

No accurate statistics are available on the incidence of influenza in Europe. Mild epidemics have occurred in the United Kingdom and the United States, and Berlin is reported to have experienced an attack of a respiratory infection termed "bomb-shelter disease". The Berlin epidemic, said to number more than 500,000 cases, appeared among individuals confined in bomb-shelters during the recent attacks on that city. Clinically the disease is said to have resembled influenza. Norway reported 69,025 cases of influenza in 1941, and 31,661 in 1942. It is probable that proportionate rates exist in the rest of occupied Europe. Civilian epidemics of this disease represent a constant source of danger to military forces in the same areas.

(3) Pneumonia and Bronchitis

Judging from such figures as are available, there has been some gradual increase in the incidence of pneumonia and bronchitis in Western Europe. Pneumonia morbidity in Norway has almost trebled since 1938. In all other countries the increase does not appear to have been so precipitous. Lack of fuel for heating, poor housing facilities, overcrowding, and varying degrees of malnutrition probably are responsible for the rising rate. Under ordinary circumstances the appearance of these diseases in Army forces will be due to climatic and operational difficulties rather than to their prevalence in the civilian population.

f. Skin Diseases

Statistics are of little use in estimating the frequency of the parasitic and infectious diseases of the skin. There is abundant evidence that skin diseases of all types have increased markedly during the war. Dirt, filth, overcrowding, and shortage of clothing, soap, fuel and hot water all contribute to the development of these conditions. Louse infestation has been mentioned previously, and there also has been an increase in human flea infestations. Scabies is extremely prevalent in all the countries of Central and Western Europe, and the number of cases seems to be steadily increasing. In addition to the parasitic afflictions infectious conditions are very common. Impetigo and pemphigus are mentioned frequently, along with other types of pustular dermatitis. These diseases may be due in part to the marked qualitative deficiency of the diet of many of the infected individuals. With a normal diet and proper attention to personal hygiene, they will be of little concern to the soldier. Under combat conditions, however, skin infections and infestations will be frequent and troublesome, and unless properly cared for may be productive of considerable lost time.

g. Trench Fever

Trench fever is a virus disease transmitted by the body louse. First knowledge of this infection was acquired during the first World War, when large numbers of cases appeared in most of the Armies fighting in Europe. Since that time the disease has been conspicuous by its absence. There have been no definite reports of the occurrence of trench fever during the present conflict, though small outbreaks of undiagnosed fevers have occurred in scattered localities which might have been trench fever. There have been no reports of the disease in Germany or the other countries of Western Europe. However, German forces in France are cautioned by medical officers that this is one of the ten principal diseases of importance to military forces in this area. This importance lies in the fact that although the disease is not fatal, the attack rate is extremely high, and the convalescent period is prolonged. It is entirely possible that outbreaks will appear during the present conflict, and if so, large numbers of cases may be expected if louse infestation is prevalent. Elimination of the louse eliminates the disease.

h. Malaria

Western Europe is not considered to be highly malarious in any part. Cases occur throughout the area, the greatest numbers being observed along the Western coast from East Friesland in Germany to Brittany in France. Increase in malaria incidence has occurred in Eastern Germany due to renewed contact with the heavily endemic foci in the Balkans and the Southwest Russian and Mediterranean areas. The most malarious areas in Europe are Poland, Southern Russia, the Balkan States, Greece, and Italy. Spain also suffered a severe outbreak in the summer of 1943. Malaria is hyperendemic in the Balkans: in some regions the splenic index is as high as 90 to 95 percent, and the parasite index may reach 65 percent. The usual season is during July, August, and September, though in some areas it may occur later. Plasmodium vivax (benign tertian) malaria is most common: aestivo-autumnal malaria, the variety due to plasmodium falciparum, varies in intensity but never reaches as high a degree of prevalence. The principal mosquito vectors in this region are Anopheles superpictus, A. labranchiae labranchiae, and A. sacharovi. Under changing wartime conditions this entire area constitutes a huge reservoir from which malaria may spread to other areas of Europe.

In Western Europe, the greatest number of cases occur in the Netherlands where in the province of North Holland, the disease may be of military importance. The Friesland area, as previously mentioned, also is significant. The principal vector in these regions is A. labranchiae atroparvus, which develops in brackish water in the marshy coastal areas. Of considerably less importance is A. messeae, a fresh water breeder which occurs in the inland areas, and which is much less often a carrier of malaria. The strain of Plasmodium vivax endemic in this region is peculiar in that persons contracting the infection may not show symptoms for a period as long as 8 months. The predominant season for mosquitoes is during August, September and October, yet many human cases develop symptoms in May, June and July. It has been discovered that female adults of A. labranchiae atroparvus hibernate in houses during the winter months, and take blood meals at intervals during this period. Infection takes place at this time, but symptoms frequently do not appear until the following spring, at a season when there are no infected mosquitoes present. This has given rise to the term "house malaria", which, while usually described in Holland, also occurs in neighboring countries. A. atroparvus also feeds upon stabled animals, and concentrations of livestock may form an effective barrier to prevent the mosquito from seeking human victims. With the deterioration of malaria control programs, the introduction of new cases from other regions, and the decrease in the number of livestock, it is probable that the frequency of malaria in Western Europe will gradually increase during the course of the war.

Germany reported only 1,613 cases of malaria in 1941 and 716 in 1942, but it is believed that this figure has risen considerably during 1943, especially if the areas in the east are considered. France has had a negligible malaria problem: such cases as did occur appeared in Normandy, Brittany and Southern France. It is probable that with the war there has been some increase in incidence in these areas. In Belgium, malaria is concentrated largely in the Flanders region. The number of cases usually is less than 100 per year, but some increase has occurred during the past two years. In Holland the reported cases in 1941 totaled 677, and 743 in 1942. Figures for 1943 are not complete, but there were 808 cases up to 1 November. The heaviest incidence was from May to September. Both Denmark and Norway have indigenous anopheline mosquitoes, but malaria is very rare. Denmark reports not more than 1 or 2 autochthonous cases each year, the rest (15 - 30) being imported. The few cases (7 in 1942) in Norway also are said to have been imported. The last endemic focus in Scandinavia is in a small area in Southern Sweden.

2. Diseases of Potential Military Importance

a. Endemic Diseases

(1) Tuberculosis

Of all the serious diseases present in Europe today, tuberculosis is considered to be the most dangerous to the general population, and ranked second only to malnutrition in numerical importance. Significance in military forces cannot be ignored. Germany is estimated to have a total of 1,600,000 cases of tuberculosis, 126,965 new cases of the pulmonary variety being reported in 1942. The number of new infections has almost doubled since 1939 when 69,482 cases were reported. No definite figures are available for France, but French authorities estimate that there are over 1,500,000 infected individuals in that country at the present time. Belgium reported 6,112 new cases of tuberculosis in 1942, which is an increase of nearly 50 percent over the incidence in the years prior to the war. In February 1943, 109,511 persons were registered as tuberculous in order to receive extra rations. This number is thought to be fairly accurate. No figures are available for the Netherlands, though in 1941 the death rate from tuberculosis was 62/100,000 population. It is believed that the incidence in Holland will closely parallel that for Belgium. Bovine tuberculosis is especially common in the Netherlands. Denmark reported an average of 3,000 new cases per year up to 1940. It is said that the disease has increased approximately 20% during the war. The reported incidence of tuberculosis in Norway has remained between 3,000 and 4,000 cases per year for the past four years.

In all of Europe, tuberculosis is reported to be of a more rapidly progressive nature than prior to the war. Health authorities are aware of the influence of wartime conditions on the development and spread of tuberculosis. Malnutrition, overcrowding, lack of fuel, and general lowering of sanitary and hygienic standards have been the most important factors in the persistent increase. There are insufficient hospital facilities to care for open and advanced cases, and insufficient food to meet the special nutritional demands. Regardless of such control measures as may be employed in Western Europe, it is not likely that the situation will improve until it is possible to alleviate the shortages of food, fuel, housing, and hospital facilities among civilian populations. In addition, the German Ministers of Interior and Labor issued a circular in 1941 designed to draw tuberculous individuals into essential war work, a practice referred to as "labor therapeutics". To prevent further spread of tuberculosis among civilians and to forestall any possible occurrence of cases in troops, armies of occupation must be prepared to assist in the application of control and remedial measures designed to protect soldiers and civilians alike.

(2) Contagious Diseases

(a) Scarlet fever

Scarlet fever has been the most prevalent of all the contagious diseases during the past few years. The incidence has risen steadily, and during 1942 and 1943, the disease has reached epidemic proportions.

Scarlet Fever

	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>
Germany	129,495	159,597	279,117	401,011
France	-	-	-	-
Belgium	-	-	-	-
Netherlands	10,257	8,841	7,198	12,694
Denmark	-	-	9,186	14,302
Norway	5,082	3,825	6,131	13,908

Germany reported 401,011 cases in 1942, with approximately the same proportion of cases for the first half in 1943. No recent figures are available for France, but owing to distribution of the infection it is reasonable to suppose that scarlet fever has increased there also. In Belgium the disease is reported to be very frequent, though there is not a real epidemic. Fifty deaths were reported in 1942, but it is thought that this number has substantially increased in 1943. The number of cases is not known. The Netherlands has reported between 7,000 and 15,000 cases each year, there being 12,694 in 1942. During the first 10 months of 1943 the disease has been more frequent, 21,701 cases being reported. There were 14,302 patients with scarlet fever in Denmark in 1942, which was a 50 percent increase over the previous year. In Norway, for the years 1940, 1941, and 1942 there were 3,825, 6,131 and 13,908 cases respectively. The epidemic in 1942 is stated to be one of the most severe which Norway has experienced. Throughout Western Europe, the disease is reported to be more severe, and complications are more frequent.

(b) Diphtheria

During 1942 diphtheria was second in frequency to scarlet fever in Germany and occupied Europe. In 1943 the number of cases is believed to have increased and it may now rival scarlet fever.

	<u>Diphtheria</u>			
	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>
Germany	143,589	138,397	173,161	289,863
France	14,019	-	-	-
Belgium	2,419	-	-	-
Netherlands	1,273	1,730	5,435	19,407
Denmark	1,106	860	917	1,661
Norway	72	138	2,609	8,349

In the Netherlands diphtheria reached epidemic proportions in 1943, when 39,055 cases were reported during the first 10 months. Reports indicate that the disease has spread over the whole Reich, necessitating the closing of schools. Diphtheria is also reported to have been a menace on the Russian front, where wound diphtheria occurred in addition to the usual faucial type. Diphtheria immunization has never been compulsory in the Reich, but inoculation was recommended to all who feared the spread of the disease. Mass immunization has been ordered for the children in the rural districts of France. The greatest proportionate increase in diphtheria has occurred in Norway, 72 cases in 1939, and 8,349 in 1942. In spite of the rapid spread of diphtheria, there is nothing to indicate that it is a more serious form than is ordinarily seen. The high attack rate probably is due in part to the large number of unimmunized individuals, and the conditions of overcrowding and lowered resistance to infection.

(c) Meningitis

Epidemic cerebro-spinal meningitis in Europe appears to occur in cyclical variations of great amplitude, at intervals of about 10 years. The last of these occurred during 1939, 1940, and 1941, the phenomenon being noted both in Europe and the United States. In some localities the rise has carried on into 1942.

	<u>Meningitis</u>				
	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>
Germany	4,903	5,413	3,248	2,730	-
France	328	-	-	-	-
Belgium	32	-	118	122	-
Netherlands	150	277	433	177	131 (10 months)
Denmark	56	55	198	122	-
Norway	29	88	490	272	-

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The beginning of the rise corresponded in many instances with mobilization of troops, although this may have been only an accessory factor, along with the progressive deterioration in general health during these years. It is believed that the peak has been passed and the disease is now on the decline.

Of the acute contagious diseases, scarlet fever, diphtheria and meningitis represent the greatest menace to military forces in Western Europe. Each is easily capable of spread by droplet infection through the respiratory passages, and susceptible individuals will be numerous. All efforts should be made to control the spread of these diseases in the civilian population to prevent any outbreak among troops.

(d) Poliomyelitis

Poliomyelitis is endemic throughout the European continent. The disease appears in epidemics at irregular intervals, and at such times may be of considerable importance.

	<u>Poliomyelitis</u>				
	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>
Netherlands	403	111	115	196	1,634 (10 months)
Denmark	98	23	-	-	-
Norway	55	56	1,726	279	-

There was an epidemic in the Netherlands in the fall of 1943 which reached its peak in September when 649 cases were reported. There are no similar reports of epidemics from any of the other countries.

(e) Encephalitis

Encephalitis (type not recorded, but probably lethargica) also is endemic throughout Europe. The number of cases is small and there have been no epidemics in recent years. Available figures for the countries of Western Europe are given in the accompanying table.

	<u>Encephalitis</u>				
	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>
Netherlands	26	19	35	22	32 (10 months)
Denmark	14	27	-	-	-
Norway	9	26	62	17	-

Unless the disease becomes epidemic, encephalitis will prove of no importance to military forces.

(f) Other Contagious Diseases

Of the other contagious diseases, the most prevalent are measles, and whooping cough. The latter is fairly common at the present time, but should give rise to no difficulty among troops. Measles is considerably more dangerous to military forces, but there is no indication of any undue prevalence at the present time. Smallpox has been reported once each year for the last 2 years in Germany, while France reported 63 cases in 1942. Smallpox is not known to be present in any of the other Western European countries. Central Europe also appears to be free of the disease except for Rumania which had 30 cases in 1942. The best source of spread to Western Europe apparently is from Spain and Portugal, where the disease is still endemic. Universal vaccination should protect troops against any possible outbreak of smallpox.

(3) Relapsing Fever

Relapsing fever is a spirochetal infection which may be transmitted from person to person by certain species of lice or ticks. Eastern Europe is an endemic focus of the louse-borne variety, the endemic area extending into Northern Germany and Denmark, and into the Balkan States. This type periodically becomes epidemic, usually in those years when typhus fever shows definite increases. The predisposing factors are the same, and include overcrowding, lack of fuel and soap, and poor conditions of general health and nutrition. Louse-borne relapsing fever characteristically occurs during the cold months of winter and early spring. Cases are reported each year from the endemic areas of Germany and the Balkans in the other countries sporadic cases have occurred at intervals. Since the war, and the general increase in louse infestation, it is probable that the incidence of relapsing fever has increased, and under suitable conditions may reach epidemic proportions. In wartime it is a disease of soldiers and morbidity may be high in units affected.

In Europe, tick-borne relapsing fever is found principally in Spain and the Balkans, but occasional cases are said to occur in Southern France.

(4) Leptospiral Jaundice (Weill's Disease)

Leptospiral jaundice is a spirochetal infection caused by Leptospira icterohemorrhagiae. This organism is common in rats which constitute a natural reservoir. Human infection may result from the ingestion of food or water contaminated with the urine or excreta of infected rats. Infections may also occur from rat bites or after handling infected rodents. The disease is fairly common throughout Europe, and tends to occur in localized sporadic outbreaks. It also is present in Germany and France, but no statistics are available. In Belgium, leptospiral jaundice was said to be very rare before the war, but in the Netherlands 50 - 75 cases have been reported each year. Dutch health authorities have indicated that the actual number of cases exceeds those reported. The majority of cases in Denmark have occurred in sewer workers and dock laborers, but only a few instances are reported each year. The incidence of leptospiral jaundice has increased in Norway, 112 cases being reported in 1941. Figures since that year are incomplete. The mode of infection in Weill's disease, and the relatively high mortality rate (4% - 32%) make this infection a potential hazard to military forces.

(5) Dengue Fever

Dengue fever normally does not occur in Western Europe, except in the coastal areas of Spain. Cases also appear in Italy and the Balkans, but not in Central Europe. The mosquito vector, Aedes aegypti, is present in the coastal areas of Western Europe from Southern Denmark to Southern France, and along the south coast of France. It is a domestic insect, but is not present in large numbers. Since dengue fever is endemic on the Continent, spread of the infection to the Aedes localities of Western Europe is a definite possibility, especially under wartime conditions. The disease spreads very rapidly in groups having a high percentage of susceptible individuals, such as will be found in military units. While dengue fever is not a fatal disease, it is capable of involving large numbers of persons in a very short time, and may produce marked prostration and weakness requiring prolonged convalescence. Its importance as a potential hazard to military operations should be stressed.

b. Diseases Which May be Introduced from Other Regions

(1) Plague

Epidemics of plague have not occurred in Europe since the turn of the century, and no case of human plague has been reported in Western Europe

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in the past 10 years. The last outbreak took place in the Russian Urals in 1923-24. At the present time plague is endemic along practically the entire Western and Northern African coasts from Dakar to Port Said, including Senegal, Morocco, Algeria, Tunisia and Egypt. Approximately 500 cases have been officially reported from this area in 1943. Both rats and rat fleas are present in abundance in Western Europe, and human flea infestations have increased. Transmission of plague from North Africa or the Azores into Europe resulting in significant outbreaks is possible but improbable. Care should be taken not to transport infected rats and fleas in planes or cargo vessels.

(2) Cholera

The last great cholera epidemic occurred in Western Europe in 1812-3-4, when Hamburg, Germany, was swept by the disease and cases appeared in many of the other countries. A localized outbreak occurred in the harbor area of Rotterdam in 1909. During the last war, cases are said to have occurred in Bulgaria in the area adjacent to the Black Sea. During the present conflict, cholera has been recognized definitely only in the east, where in India alone there have been 224,340 cases during the first 9 months of 1943. There have been doubtful and unconfirmed reports of cholera in the Baltic countries in 1942, and it was rumored that the disease had appeared recently in Holland. The latter statement was proved to be without foundation. Under present conditions the introduction of cholera into Western Europe is considered improbable. Mass movements of troops, civilians or prisoners-of-war from endemic areas will greatly increase the hazard from this disease.

(3) Yellow Fever

The domestic mosquito Aedes aegypti, the vector of dengue fever, also transmits urban yellow fever. The continent of Europe is outside the yellow fever "belt", and no autochthonous cases are seen. The disease has been diagnosed on occasion, but in each instance the infection has been contracted elsewhere. Under present day conditions of rapid air and sea travel and the rapid shifting of large groups of individuals in wartime, it is conceivable that infected mosquitoes, or sick individuals might enter areas where Aedes aegypti is prevalent.

3. Diseases of Importance or Potential Importance to Civilian Populations

a. Malnutrition and Deficiency Diseases

The problems of food supplies and rationing, and the qualitative and quantitative adequacy of the diet have been discussed (see Section 1, 5). In spite of the diversified opinions as to the caloric value of the diets in Western Europe, there can be no doubt of the qualitative deficiencies that exist. In addition, the quantities of such foods as meats, milk, eggs, fats, and sugar are insufficient to supply metabolic demands. Malnutrition has made its appearance in Germany as well as in the occupied areas. Weight loss is common, especially in adults, and may reach 30 percent or more of the normal body weight. In many instances the marked shortage of protein in the diet results in the development of nutritional edema. Retardation of growth of children, loss of weight, and failure of proper mental development has also been reported to occur in these areas. Conditions are somewhat better in the Reich than elsewhere, but even here, the evidence of malnutrition in nearly all classes is freely admitted. It is apparent that actual diets received have not yet reached starvation levels, but this is probably due, in large measure, to the efforts of the individual to obtain extra food rather than through the aid of the occupation authorities.

Malnutrition can never exist alone in the presence of such obvious omissions in diet. Almost invariably there will be some manifestation of vitamin deficiency disease as well. In infants and young children lack of fat soluble

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vitamin D is most dangerous, resulting in the development of rickets, and its sequelae of altered growth and bony deformities, as well as almost irreparable damage to teeth. In older children skeletal changes are less marked, though skeletal growth and tooth structure are still affected. With further increases in age the effects of lack of vitamin D are less important. The shortage of normal supplies of fish liver oil also has resulted in insufficient supplies of vitamin A. Increasing use of whole grain bread and cereals has alleviated to some extent the shortage of the B complex group of vitamins. Vitamin C deficiency may cause pronounced symptoms at all ages. The typical changes in scurvy are usually first seen in the mucous membranes of the mouth, but changes in the bones, teeth, and subcutaneous tissue are common. Of the multitude of symptoms ascribed to various vitamin deficiencies it is only safe to say that such deficiencies are usually multiple and closely interrelated, and at present intimately bound up with the problem of malnutrition.

Many other complaints have been attributed in whole or in part to malnutrition, deficiency diseases and the generally poor quality of the food, including gastric and duodenal ulcers, gastro-enteritis, chronic fatigue, and ready susceptibility to all types of infection.

The principal needs of the occupied nations are the essential foodstuffs, meat, milk, eggs, vegetables, fruits and butter. With an adequate diet, vitamin concentrates lose much of their importance. Problems of food supply to civilians are an important consideration for any force occupying the countries of Western Europe.

- b. Tuberculosis. See Section III, paragraph 2, a, (1)
- c. Typhus Fever. See Section III, paragraph 1, b.
- d. Enteric Infections. See Section III, paragraph 1, a.
- e. Venereal Diseases. See Section III, paragraph 1, d.
- f. Contagious Diseases. See Section III, paragraph 2, a, (2).
- g. Respiratory Infections. See Section III, paragraph 1, e.
- h. Infectious Hepatitis. See Section III, 1, c.
- i. Skin Diseases. See Section III, paragraph 1, f.
- j. Intestinal Parasites

Considering the widespread use of human waste as fertilizer it is not unusual to find that many of the intestinal parasites have a wide distribution in Western Europe. In general, the intensity of infestation is greater in the Netherlands, Belgium, Germany, and France, and is less in Denmark and Norway. Taenia saginata and T. solium are found throughout, though T. solium is said to have practically disappeared from Belgium. Echinococcus disease is encountered principally in Germany and France. Hookworm infestations have been reported in miners from the adjoining provinces of Limburg in Holland and Belgium. The incidence of hookworm disease in this group is said to have diminished markedly in recent years. The common intestinal parasites, Ascaris lumbricoides, Enterobius vermicularis, and Trichuris trichiura are more or less common throughout Europe, especially in children in the rural areas.

- k. Undulant Fever

Contagious abortion of cattle is endemic in Western Europe and brucella infections are frequently present in humans. No statistics are available for Germany, France and Belgium. In the first two countries, the disease is re-

cognized regularly in cattle, and human brucellosis is endemic. According to Belgian authorities, undulant fever is rarely diagnosed in humans. However, in the Pasteur Institute at Brussels a number of sera are tested each year which give positive agglutination reactions. In the Netherlands 25 to 50 cases are reported each year. Brucellosis is especially prevalent in Denmark, which has over 500 cases yearly, in spite of routine testing of dairy herds. Norway, with its large cattle and dairy industry, has had no more than 5 cases yearly since 1939. Since the disease is contracted through the ingestion of dairy products from diseased cattle, an additional reason appears for avoiding the use of local milk supplies.

l. Tularemia

The general distribution of this disease in Europe is not known. It has been reported from Germany, Austria, Poland and Russia, and is thought to be present in the Southern part of Denmark. In Norway tularemia is endemic but periodically takes on the character of a very mild epidemic during the so-called "lemming years". Both the lemming and the wild snow hare act as animal reservoirs of the disease. Tularemia is sufficiently serious to warrant special precautions in the handling of wild game.

m. Trachoma

Trachoma is endemic throughout Europe but occurs principally in the eastern part, in East Prussia, the Baltic States and Poland. Figures for the expanding German Reich show a marked increase from 625 cases in 1936 to 8,564 in 1942. Approximately one-third of these cases have occurred in Germany proper. In France and Belgium cases are reported frequently. The Belgian health authorities had very nearly succeeded in eliminating trachoma, but it is apparent that the disease is again on the increase. The infection is said to be rare in the Netherlands. There is no mention of the disease in Denmark and Norway. It is expected that trachoma will continue to increase in the endemic areas so long as present conditions exist.

4. Miscellaneous Diseases and Conditions

a. Psittacosis

There are a number of less common diseases and conditions which occur relatively infrequently in Western Europe, and which will be of little interest to military forces. Psittacosis, or parrot fever, has been discovered to have a fairly general distribution, and is common in pigeons. Occasional cases may be encountered in any part of Europe, but the disease is reported most frequently from Germany.

b. Rat-bite Fever

Rat-bite fever, a type of relapsing fever caused by Spirillum minus, is reported, especially in the coastal towns.

c. Epidemic Keratoconjunctivitis

Epidemic keratoconjunctivitis has made its appearance in Western Europe also, but is not considered to be of special importance.

d. Leprosy

Leprosy may occur in this area, but the majority of cases are probably imported from endemic areas in the tropics.

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e. Rabies

The incidence of rabies appears to have increased somewhat, though not to any serious extent. Normal facilities for the preparation of preventive inoculations still exist.

f. Tetanus

Because of the large agricultural areas in Western Europe, it is natural that tetanus should be a fairly frequent occurrence, especially in the rural areas. France, Belgium and Germany report cases most often.

g. Gastric and Duodenal Ulcers

Of more than ordinary interest is the rapid rise in the number of gastric and duodenal ulcers. Increases are reported especially in Germany, France and the Low Countries. Continental health authorities ascribe the increase to the qualitative and quantitative deficiencies in the diet as well as to the strain and nervous tension in present day Europe.

h. Foot and Mouth Disease

Of the animal diseases, foot and mouth disease most often appears in epidemic form, outbreaks having been reported from Belgium and Norway. In the Norwegian outbreak in 1941, when a large number of cattle had to be slaughtered, the Germans took the opportunity to slaughter a number of non-infected cattle for their own use.

i. Actinomycosis

Actinomycosis is recognized regularly throughout Europe.

j. Anthrax

Anthrax is endemic in the large livestock and cattle areas in these countries.

k. Glanders

Glanders is also endemic in the large livestock and cattle areas in Europe.

l. Leishmaniasis) These diseases, common to tropical and subtropical
m. Filariasis) regions, are occasionally seen in Southern Europe.

n. Schistosomiasis) Infections with Leishmania donovani, (kala azar)
are found in Southern France, but none are present
in any of the other countries of Western Europe. These diseases appear sporadically
in Portugal, Spain, Italy, Greece, and the Balkan countries.

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APPENDIX

The detailed tables and reports listed below are available for study in the Office of the Chief Surgeon, APO 887.

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